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A FEW NOTES ON TARSAL AMPUTATIONS—TRAUMATIC AND ARTIFICIAL AMPUTATIONS—SUBSTITUTES OR PROTHETICAL APPLIANCES FOR LOST PARTS.

Read in the Section of Surgery and Anatomy, at the Forty fourth Annual Meeting of the American Medical Association.

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The facilities, the appliances and the aids which the inventions of man and modern science have made available for operating surgeons, have so radically revolutionized the whole domain of surgery that it may now be affirmed, without fear of contradiction, that many of the dogmas promulgated and beyond cavil, as late even as the middle of this century in which we live, have become obsolete and antiquated. The almost lightning rate of American inventions has been a tremendous leveler of traditional doctrines of the near past. American invention has led the whole world, and in every place in which civilization exists, however remote, its impetus is felt. So that the unprejudiced of every clime and every race must concede to the land of Columbus the first and highest place among those nations which have made the world better, softened the hardships of the past, and spread broadcast those blessings which spring from a free, enlightened, liberty-loving and God fearing people.

Without the interposition of any miracles the lame and limbless have been made to walk; the blind, see; the toothless, masticate; the strangling, breathe; the crooked, distorted limbs have been made straight, etc.; but the crowning glory of all, is ours—of transporting the agonizing sufferer, during the torture of surgical procedure into the dreamland of repose and happiness.

Who that has traveled abroad but has observed that our surgical dressings, for profusion and quality, are unrivaled. Our modern operating theater, dietary, sanitary arrangements and nursing are difficult to excel.

But to the subject proper, and let us see at this, the great centennial of America's history, where we are on the question of the most appropriate treatment of those pathological and traumatic disorganizations of the foot, which involve an amputation in its continuity.

Of recent years, since the art of prothesis has reached such an advanced degree of perfection, it would seem from the startling assertions which we hear that, in the future, if we would treat those mangled or pathological conditions which extend into the tarsus with the best advantage to the patient, the entire foot should be sacrificed with the ankle joint included; in other words, that we must wholly disregard all former rules with reference to preserving all vitalized tissues, when such a lesion exists as heretofore called for a tarsal or mediotarsal severance.

Let us first hear what a well known manufacturer of artificial limbs has to say on this subject. Mr. Charles Truax of Chicago, at the meeting of the American Association of Railway Surgeons held at Buffalo May 1, 1891, in presenting an essay on this subject said: "In amputations of the anterior part of the foot, it is just as certain, if you remove any of the bones necessary for the maintenance of the plantar arch or sever the plantar fascia, that you will destroy the usefulness of this arch, as it is true that the leaving out of a single stone from the span of an arch will permit it to fall; and whether you perform a Lisfranc's, Hay's, Forbes', Chopart's, the subastragaloid or an osteoplastic operation, you leave your patient a foot that is of *no value;* except to carry weight. In such cases the utility of the foot is either greatly impaired or wholly destroyed, and the portion allowed to remain becomes a useless appendage; worse than useless, as it is in the way of providing for something better. . . . . *Do not amputate between the metatarsal bones and the junction of the lower and middle thirds of the tibia. At all other parts save all you can; and you will, in every case, have done the best for your patients.*"

It may, perhaps, be regarded as a matter of questionable propriety to introduce the views of an artificial limb maker into a discussion on a surgical subject; but after a moment's consideration we can see that this is a fallacy, for it can be readily shown that it is only when the prothetician and the surgeon coöperate, the best interests of the mutilated patient are served. It is a well known fact that in the most of our populous cities to-day many dentists do nothing but extract teeth, while there are others who occupy themselves exclusively in fitting and repairing. Each excels in his own branch. As a rule, when the surgeon amputates a limb and the patient leaves the hospital he seldom sees any more of him, as he has finished his part and turns him over to the prothetician.

Now, generally, when he leaves the surgeon who has sacrificed the limb he feels that the latter is quite through with him, and turns to the artificial limb maker as his natural friend, to provide him a substitute for what is gone. To the latter he now goes also for *treatment* of his artificial limb as this, in time, shows the need of readjustment, removal or repair. Hence, while the surgeon has the man under his observation for weeks only, the latter seldom loses sight of him for his entire life. Accordingly, the opinions, judgment and experience of those who have given years to the craft of prothesis should not be unheeded; but be duly approved, appreciated, criticised or condemned as occasion requires.

It would seem little less than a barbarous mutilation in diseases of the teeth, when several sound members of the group survive, to wrench them out of their sockets and replace the entire arch by an artificial set; but experience and observation have alike convinced the surgeon-dentist and patient that, in order to secure the best æsthetic effect with the most comfortable and powerful set of grinders, that this sacrifice of healthy structures is often a necessity. Hence, in this instance, theory has to give way for practical demands, and a new art has demanded new conditions. Without doubt, to a certain extent, the same principle will apply to the adaptation of artificial substitutes, in those cases of disorganizations of structure which are limited to the joints of the foot and other parts of the body.

It may be prudent, before we enter on the question of which division of the parts shall be made in the foot, or partial foot amputation to, for a moment glance at the anatomical architecture of this organ, its physiological functions, and the almost total want of analogy between it and the hand.

Roughly speaking, the foot serves but two purposes: 1, as a support to the body; and 2, for carrying the body for locomotion.

In the standing attitude it may be said that the entire weight of the body is transmitted, through the tarso-tibial articulation to the surface of the heel. The plantar-arch, the anterior, tarsal, metatarsal and phalangeal structures while the body is in repose in the upright position serve no purpose except to, in a slight degree aid in the balancing of the body, preserving the equipoise; for it is only in locomotion, walking, running, jumping and similar movements, these are called into active exercise.

Those parts of the plantar surface which come in direct contact with the earth are thickly clothed with an investment which has immense elastic, resiliant properties. These consist of a cutaneous covering of great density and thickness, subcutaneous fibro-adipose tissue, the plantar fascia and cellular tissues. Now, it is absurd to talk of substituting any sort of a stump covering which can in any manner whatever, compare with this for its resisting power against pressure or friction. On this point[1] an author imparts a statement which, without doubt, will strike many as astonishing news. He says: "Before entering into discussion on the principles most important to be observed in the construction of a good stump, I desire to call attention to the erroneous impression regarding the wearing of an artificial limb that exists in the minds of many surgeons. This opinion is to the effect that in most cases following amputations in the lower extremity, the weight of the patient, or at least a great portion of it is borne on the stump. It is true that this follows some operations, but it is the exception and not the rule. When a section has been made through a bone no weight can be borne on the end of the stump. Disarticulation, or an osteoplastic operation alone will admit of pressure; . . . . . There are to-day thousands of patients wearing legs designed by Yankee inventors, where not even an ounce of weight is borne by the end of the stump."

This maker was perhaps a little extravagant when he said that there was not *an ounce* borne by the end of these stumps; but if he intended to convey the impression that they sustained no other weight than was necessary to secure an adjustment without wriggling or a swaying motion of it in the sheath of the artificial limb, he was entirely correct, as I am able to testify from my own experience, in not an inconsiderable number of cases.

How, then, in the face of such an allegation, which is well supported, one can by any species of philosophical reasoning advise the deliberate sacrifice of the ankle and the entire foot, when it is diseased or damaged, in any of its areas posterior to the metatarsus, is indeed inconvincible. This is retrogression, and brings us back to the time which antedates anæsthetics and aseptic surgery; when the operator, in order to operate with the greatest celerity and with the least infliction of anguish to his patient, as a common rule always severed the entire foot above the ankle joint for any condition of it rendering an amputation of a part of it necessary. On this subject Mr. Thomas Bryant, in his unrivaled textbook, speaks in no doubtful terms. He says: "In no part of the body has improvement in modern surgery shown to better advantage than in the foot; for in none has so much been done in the way of conservatism. Where formerly amputation of the whole foot was common, now we have Hey's, Chopart's, Sym's, Pirogoff's, the subastragaloid and Hancock's amputations; all founded on the well established position that governs, *or ought to govern*, in all amputations; viz.: that no more of the body ought to be removed than the necessities of the individual case require; or, in other words, upon the principle of the least sacrifice of the parts. To amputate a foot, when anything else will suffice, in the present age is regarded as almost criminal; and, surgeons generally accept Hancock's well-put question in his valuable lectures. . . . . "Can anything be more unphilosophical than to advocate the sacrifice of any bone, or part of the foot, for no other reason than that a particular operation should be performed? We should perform our operation as close to the damaged structures, and preserve as much of the foot as we possibly can with safety to our patient."—(*Bryant's Surgery*, p. 922, Ed. viii.

Ashurst says, "that Chopart's amputation was particularly studied by the late Mr. Hancock, who found that out of 152 cases but 11 died; a mortality of 7.2 per cent while no less than 120 out of the 126 who recovered had useful limbs. The results in subastragaloid amputations, says Ashurst, are more satisfactory. He cites Stephen Smith of New York, as saying that the Syms' stump is better adapted to an artificial limb than any other. Syms denounced Perigoff's amputation; but nevertheless, I have seen most admirable stumps after it, and entertain no doubt of its value. (Ashurst's Encyl. Vol. ii, p. 617). There is nothing in the latest American work, the "System of Surgery, by American Authors" on the controversial side of the question; nor is there a line in either of the two great French works, separately edited by Réclus, and by Péan, which have recently issued from the press.

Erichsen, when the foot is so crushed that one cannot with accuracy recognize the living from the dead parts, envelops the entire foot in a carbolic acid solution—1 to 20, and defers amputation until the exact limit of injury can be defined (Erichsen's Surg., Ed. viii, p. 140). Speaking of Sym's amputation, he says: That by it, the

[1] Amputations in the Light of Prothetical Science. By Mr. Chas. Truax.

patient is spared an amputation of the leg; that it bears an exceedingly useful stump, which constitutes an excellent and useful basis of support. The results in Chopart's amputation, he says, are entirely favorable to the patient; as by the aid of a purposely constructed artificial apparatus he is able to walk, run, and even dance with little, if any, appearance of lameness. He admits that the heel is drawn up in some cases, but quotes from Verneuil, who alleges that this complication is almost never seen, except in cases of amputation for disease and that it existed before operation. He never saw it in a primary amputation. Mansell Moulin (*Syst. Surg.*, p. 1380) says: "That the stump left after a Perigoff amputation in many cases is exceedingly good; but that sometimes the stump will tilt forwards against the ground. This can be obviated by dividing the tendo-achillis and suturing the tendons in the periosteum."

The late Dr. A. B. Watson, was not an advocate of Chopart's amputation. In his valuable work on "Amputations and the Principles on which Artificial Limbs should be Constructed and Worn," he there sets forth in his usual clear and energetic style the reasons why he took this position. He is the only author whom I could find, against the medio-tarsal amputation.

In the hand, our aim in amputation or treatment of a limited disorganization is to be guided mainly by two principles: first, to spare what we can, for prehensile purposes, and secondly, for its æsthetic effects. The foot not serving the same physiological function of the hand, and being always covered, the homely, awkward shape of the stump we care nothing about; as the strength and utility of the limb alone concern us.

But, since I have given this subject serious thought and careful study, the question has often occurred to me, "why do those medio-tarsal, or tarsal amputations at all?"

In an active traumatic surgery of more than ten years, and of a mixed pathological and traumatic surgery of the same time, I have never seen a single case which, to my mind was appropriate for a medio-tarsal amputation. I have never performed one. But, there is one principle which, in my practice, has been rigidly adhered to in traumatic disorganization of the upper and lower extremities alike—in any part of them, viz.: first, never to do an immediate primary amputation of any kind; and, secondly, to spare every particle of healthy bone, wherever situate, that we will have ample integument to cover.

The medio-tarsal or the tarso-metatarsal in the subastragaloid amputations all leave a very large stump surface, which necessitates a very extensive area of integumental flap to close in. At the tarso-metatarsal,and in the medio-tarsal junctions, we must have the entire plantar surface up to the webbing of the toes for a flap; else our amputation fails. Now my experience has been, that in those traumatisms in which so much of the plantar surface is intact that it preserves its vitality to the metatarso-phalangeal articulations, the metatarsal bones above though extensively fractured, as a rule may be preserved; hence, the body of the foot spared.

It is true, that in not a few cases of smashes of the foot we are sometimes obliged to make an extensive sacrifice of healthy bone-tissue, when a slough of the skin has over a large area laid bare the underlying parts.

Again, I may repeat that the fundamental principle on which my line of treatment, in all mangling lesions of the foot and other parts is based, has been to *spare everything* which will survive with comfort to the injured. This principle rests on the humane assumption that we have no right, in order to carry out a theory, to sacrifice a particle of living tissue. If for cosmetic or purposes of increased utility the patient, of his own will, desires a secondary operation after the primary lesion has healed, it may any time be performed. There are other cogent reasons which support this line of action. Among the most important comes the medico-legal aspect of the case.

In the event of a civil suit for damages after certain amputations on the foot the question might, with good reason, arise: would not the patient have had a much more comfortable and useful stump and stronger limb, if no artificial amputation of any kind had been performed?

My own experience in a large number of these cases would incline me to answer this question in the affirmative. For it is a custom with me, which is never deviated from, not to remove any tissues in mangling lesions of the foot, which have not been totally destroyed, by the "traumatic amputation." If, as the mortified parts are detached, the demarkating line is formed and the soft parts retract, parts of living bone project into the hiatus, they should be resected far enough back to permit the integument or cicatrix to fall in, easily over, and enclose them.

A SHORT SYNOPSIS OF TWELVE CASES OF TRAUMATIC AMPUTATIONS ON THE FOOT, WITH ONE ARTIFICIAL AMPUTATION.

With two exceptions these cases all occurred within the past three years. Nine were hospital cases and three in private practice. All were males:

Case 1.—Patient 32 years old, middle size, in good health. An athlete and prize fighter. Crushed, as he was trying to mount the front platform of a street car.

Immediately after the accident he was taken up by an ambulance and brought to one of our principal hospitals. Here, when the foot was examined, he was informed that it must come off above the ankle joint. Took fright at this statement. Sent for a carriage and was brought to a hotel, to which I was called, about two hours after the accident.

On examination of foot it was found that the car wheel had passed obliquely over the outer aspect of the foot, crushing in and extensively shattering all the metatarsal bones, except those of the great toe, and laying widely open the soft, overlying parts.

The foot was thoroughly cleansed, all the bleeding points secured; but nothing cut away at this time. Limb placed in sterilized, copious dressings, bandaged lightly and placed in an elevated position.

There had not been much local pain, little temperature, or constitutional disturbance; the dressings were not disturbed, for four days. At this time everything was removed and parts exposed. All the toes dead except the great one. Great swelling in the toes; and tissues below the swelling black, bloated and bedewed by a free ichorous discharge. There was no foulness to the odor of the discharges. The body of the foot, on the dorsum and plantar surfaces seemed healthy.

Dressings now changed every day. The line of demarkation in a week well outlined. The necrotic tissues by the tenth day were becoming rapidly detached. On this date those parts which merely hung by tendons were cut away. In two weeks all the slough had come away, when it was found that the damage to the foot was limited to the metatarsal bones; all except the first destroyed to a point close to their articulations. The difficulty which now confronted us, was to fill in the breach occasioned by the loss of substance. A medio-tarsal amputation would not do here; hence, it must be an amputation above the ankle joint as had been suggested by the hospital surgeons. But the great toe served no useful purpose where it was; and accord-

ingly I adopted that invaluable procedure of M. Guermonprêz of Lille, of *disossment*, as he designates it; the toe was split along its inner aspect, over its entire length, the nail removed with its matrix, and all the phalanges and its metacarpal bone. Now this large vascular flap was turned into the hiatus, sutured and firmly bandaged. It filled the gap perfectly. Dressings removed in four days. Union entire. After this dressing there was little else to do. He made a rapid recovery; and now with the aid of an artificial apparatus he walks with scarcely a limp. This case and several others of a similar description were exhibited before the surgical section of the New York Academy of Medicine in the winter of 1892.

Case 2.—A young German editor, while dismounting from a train while in motion on a dark night, mistook his footing and had both feet crushed by the wheels. With one, the flange of the wheel cut it in two, crossing over it in a sharp diagonal direction, crushing everything through from the astragalo-scaphoid-articulation and the cuboid bones. This was cut through as sharply as with an ax; the tendons flattened out and torn, yet holding on to the mangled parts anteriorly. This was the left leg. With the right, the damage was not so extensive. Here, the wheel crossed obliquely, clipping away three of the toes and crushing through their metacarpus.

The wounds in this man's case were treated as the preceding. After eleven days the damaged structures were pretty well separated from the healthy. With the lesser injured limb the jutting ends of the uncovered metatarsal bones were cut away with the rougeuer, sufficiently far back to permit ample covering as the wound cicatrized. About one-third of the surface of the foot was lost on this side At this time on the left side we had a large, open, healthy granular surface of very large diameter, with nothing to cover it. The heel and ankle joint were perfectly healthy. This man was but 32 years old, in good general health.

Now the question arose as to what was to be done with his right foot, or what was remaining of it?

After a consultation it was decided that as the exposed surface was so large, grafting would be impracticable, and hence, that a Syme's amputation would be the operation which would provide the most useful stump for support and locomotion.

This operation was performed, but on the third day, as it was found that the flap sloughed, an amputation of the leg was performed at the junction of the lower with the middle third. From this he made a good recovery. Two months after, prothetic appliances were adjusted and he commenced to walk.

Now this was a typical case in which to test the comparative value of a partial foot amputation on one sine and its complete sacrifice on the other, at the point in the leg indicated. What has been the result? Simply that there is on comparison in the relative value of the limbs.

It was months before an artificial limb could be borne on the left side. The stump was sensitive, requiring soothing applications and special treatment, and rest at intervals for months; though it had a loose, simple integumental coming. This reminds me that the current teaching that an integumental covering makes the best stumps is a fallacy, for I have seen too many cases in which scar tissue when clothing the end of the bone gave the least annoyance and the most comfort. This gentleman with his right foot, which had suffered but a partial amputation, and was well fitted with an artificial contrivance had every comfort.

My only regrets are that I did not make a further effort to spare the other ankle joint, for I now feel that it is only after every other expedient is exhausted we are ever justified in sweeping away this powerful articulation.

Case 3.—Patient a young man of 20, in good health; three months previously in Savannah, Ga. had his right foot cut off through the anterior and middle thirds of the plantar arch by an accident in a saw-mill. An amputation of the entire limb was advised. He would not consent to it, and he came on to New York. In the first institution that he entered here, the same thing was recommended as in the South. But he refused again, when, as he had no means, he was advised to enter the almshouse, as he was a cripple. He went to an uncle in this city who brought him to the Harlem Hospital. On entrance he was hobbling about on crutches. The whole end of his foot was an open ulcer, very painful and freely discharging a sero-purulent material. The edges of the integument were turned in, but there was not enough tissue to cover in the now necrosed ends of the metatarsal bones.

Patient prepared for operation. Limb scrubbed, disinfected and swathed in sterilized gauze dressing. He was now etherized. All the diseased protruding portions of bone removed with gouge and rougeuer, until a healthy, hard, vascular surface was reached. Surface ring of the overlying, torpid integuments cut away. A flap of tissue on opposite thigh partially detached, foot brought up and fixed there by gypsum dressings, with the autoplastic graft imbedded in the gap. The whole of the graft did not take, but enough contracted adhesion to materially aid in closing in the opening.

Six weeks after this operation patient left the hospital with a useful and serviceable stump of a foot. As he had not walked on it for so long the sole was quite tender; but with the aid of a stick he got along very well. I saw him six months later, when he was working in a livery stable. Now walked well without crutch or cane. As yet, is not able to purchase artificial support. In this case, after final bone resection and union of the integuments nothing of the osseous parts remained in the foot except the tarsal bones. There was never any tendency to retraction of the heel.

Case 4.—This patient, a young man, 26 years old was injured by having his right foot removed by a trolly car wheel. Those electrical cars, because of their increased capacity and carrying part of their motor power within them, are very heavy.

All the toes of foot crushed into a pulp. The distal ends of all the metatarsal bones ground off. It was impossible to define the vital line at time of entrance; hence, we pursued our usual course in this case of traumatic amputation as we do in all others of any description, i.e., we effectually subdued all hemorrhage, dressed, adjusted the limb and waited. After ten days line of demarkation formed, when a large charred, dry plaque of dead integument was thrown off the plantar surface of the foot. Now protruding ends of metatarsal bones removed with the rougeuer; when the usual dressings were applied.

One month later breach entirely healed, and patient discharged. This man I saw recently. He walks with scarcely a limp and pursues his ordinary occupation of a cigar box maker.

Case 5.—This patient was a boy of 6 years of age, who had sustained an intracondyloid fracture of the left femur. The popliteal artery was destroyed; and before collateral circulation had become well established, all the toes of the foot below, and the soft parts as far back as the tarso-metatarsal articulations, gangrenous.

The sore became infected and the faculty physician advised an amputation above the knee joint; but he has steadily progressed towards recovery; the foot and leg have been preserved, and give promise of doing good service in the future.

Case 6.—These two cases may be considered together. Both were injured by horse railroad accidents. Each had sustained damage to one foot in about the same situation, viz.: at the tarso-metatarsal junction. In both, the same tentative course was pursued, with the result that each—one ten years after injury and one, one year, walks without lameness.

Case 7.—Two years ago a carpenter of middle age came under my care, who had his right foot smashed by a falling piece of lumber. A typical traumatic amputation had been effected through the posterior third of all the metatarsal bones; but, there was a singular escape of the sole of the foot, so that when the slough was thrown off and the ends of the bones resected it was utilized for a flap to close in, the parts. Since the wound healed, by the aid of an apparatus he has made his living at his trade; some stiffness in his gait but he has a useful supportable stump.

Case 8.—This case came under my observation during a bodily examination. It is incorporated here because it belongs to the family under consideration, though it was not treated by me.

Patient was a salesman three years before in Ireland; had his left foot crushed by a railroad accident. Sir Wm. Stokes of Dublin performed a Chopart amputation on the foot. The result was ideal. He walked without a limp; had a smooth, soft comfortable stump; not the slightest retraction of the heel, and wore no apparatus.

Case 9.—Patient a man of 64, diabetic; had incipient senile gangrene of toes of the left foot; in great pain. He had been in hospital in New York, under surgical treatment; but the persistence of the glycosuria stayed the hand of the operator. Went home to Brooklyn, N. Y., at which place shortly after leaving the hospital, I performed a medio-tarsal amputation on diseased foot. Gangrene set in promptly after operation, when I performed a second amputation at the

junction of the lower and middle thirds of the leg. This wound healed promptly and an artificial limb was subsequently worn; when he returned to his trade of stone-cutter. One year after had gangrene in opposite foot, from which he succumbed.

Case 10.—Patient, a young man, had his foot crushed in an elevator. The foot was tampered with by improper treatment until a general cellulitis and an osteomyelitis occupied a considerable part of it.

When called in to see the case an immediate amputation was advised, as gangrenous processes were rapidly extending into the ankle. A species of modified Chopart was performed, which had the desired effect in arresting pathological processes.

Wound healed kindly. By the aid of an apparatus he now walks without a limp, and congratulates himself that his whole foot was not amputated.

Case 11.—Patient a hostler; had his foot injured by being crushed under a horse's hoof. Developed suppurative osteomyelitis and sent to hospital. An amputation of the entire foot was recommended. He would not consent to this and was sent home. Here I saw him.

With him, all the toes had to be removed, three of the inner metatarsal bones, and about one-half of the shafts of the two outer.

Plenty of healthy soft parts to cover in the openings. Parts readily healed. The result has been entirely satisfactory. He never could afford an artificial apparatus, and thus far, now nearly two years, has managed to follow his usual occupation without any serious drawback. He is but slightly lame, and being obliged to stand a considerable part of his time, the resulting stump is severely tested.

Case 12.—This I record as one of Chopart's amputations which went badly. The patient, a hearty middle-aged man had his left foot crushed by being struck by a missile of flying rock from a blast. The attending surgeon performed a medio-tarsal amputation. The wound healed by first intention in about three weeks.

He came to me six months after the original amputation, telling me that his limb was useless, as it could bear no weight whatever. After consultation I amputated what remained of the foot and the leg in its lower third. He now wears an artificial limb with comfort.

Case 13.—This patient was not operated on by me. But his case is of interest as showing what can be accomplished with a Chopart amputation with a properly adjusted apparatus. He was 24 years old. Two years before had a Chopart amputation performed for an injury to the foot. He came to me for treatment of a varicocele, when I discovered that he had an artificial apparatus on his leg, and he showed me the stump after completion. He informed me that unless he informed people they never would suspect anything wrong with the limb at all. He said he went to several balls during the past winter and went through all the dances without the slightest trouble.

He was a drummer for a jeweler's house and almost constantly on his feet. Without the artificial elastic adjustment which he wore, he said walking was very painful and difficult.

To my mind one good reason for making amputations low down near the ankle joint in healthy young subjects is, that should a tender, sensitive or painful stump result we can go up with a second amputation, and yet have an ample length of the leg kept for the comfortable adjustment of an artificial limb. When the amputation is at the junction of the lower and middle thirds, a second amputation is much more dangerous to life, and will leave so short a stump, it may interfere with effective prothesis. How many of those mid-tibial amputations do we see in which the stump can tolerate no pressure of any kind, and locomotion is possible only by bending the knee and strapping a sort of crutch-shaped apparatus to it.

It may be affirmed then with every argument that sound logic can advance, that in lesions, traumatic or pathological of the foot, the principle should be enforced of sparing any portion which will preserve its vitality. Should it be discovered later that, as an aid to prothesis, another section will render locomotion more effective and comfortable it may be made, but not without an understanding with the patient that this latter expedient may not improve his condition.

Dr. Quimby of New Jersey—In 1877 I read a paper before this Association describing an operation which is a modification of Pirogoff's and superior in that I do not disturb the cartilages on the extremities of the tibia and fibula. A great many injuries to the foot are followed, very wrongly by amputation. In this operation I make a curvilinear incision over the anterior portion of the foot, disarticulate the astragalus from the os calcis, saw off the anterior portion of the os calcis, and turn the sawed surface directly up against the cartilaginous surface of the tibia. In many cases I get union by first intention. The whole weight of the body can subsequently be borne upon the stump without the patient flinching. There are now in Jersey City two cases still walking about upon whom I operated in 1877, and to see them you would not know that there was anything the matter with the foot, although of course there is no spring to the step. This method has an excellent advantage in the case of a child or youth in that the growth of the bone goes on, as is not the case after a Syme's or a Pirogoff's operation. It is such a simple operation that any surgeon can do it, and it will result in great benefit to the patient. We should not think so much of the beauty of an operation, but of the results. We want conservatism in surgery, and this is one of them.

Dr. Maclean of Michigan—There is some force in Dr. Quimby's assertion as regards the danger of causing a shortening and a defect in the symmetry of the limb. It is a misfortune if we have to remove the epiphyses in the case of a child, but my experience is that if Syme's operation be properly done there is not much arrest in the growth of the limb; we remove only the cartilage not the epiphysis. I give Dr. Quimby full credit, but so far as I know his operation has had only a very limited trial and I am afraid that in some of those cases there is danger of an inflammatory process taking place in the articulation. Syme's operation has been long before the public and has been thoroughly tested. I have done a large number of them and my experience is that I would be very slow to abandon it for any method yet suggested. When accident necessitates an operation it is the surgeon's duty to do the best he can and he may not be able to do Syme's operation, but when a choice is left it is my experience and that of the profession all over the world that the argument is overwhelmingly in favor of the Syme's. In tubercular disease it is immeasurably ahead of all because it leaves behind nothing to endanger a recurrence of the disease. In conclusion I will say that I have thought the Syme's operation the proper one for the ankle, but if it is to be above the ankle it is better to go near the knee where you will have a choice of two methods of after treatment—that is with an artificial limb or the knee can be bent and not have a long projection behind.

Dr. Somers of Wisconsin—I agree with Dr. Quimby in all he says; a mucous and a cut surface will unite; it will be found infinitely better than will two cut surfaces.

Dr. Link of Indiana—Another element should enter into the consideration of this subject as well as conservatism; a life is always worth more than a limb. I have had some experience in traumatic surgery, both during the war and afterward in the railroad service, having performed in all over 400 amputations. During the war we abandoned operations about the foot. I remember at Murfreesboro an operation by a regimental surgeon upon the foot of an officer. Healing took place nicely but afterwards, when he went into field service, in riding horseback, irritation of the stump was occasioned by pushing the foot into the stirrup to such an extent that the sufferer was compelled to leave the field, return to the hospital, have an amputation made higher up and obtain an artificial limb.

Dr. Rodman of Kentucky—I have always insisted that all of these operations on the foot, Sir Francis, Syme's or Pirogoff's—have their distinct field. Some of my associates insist upon amputation above the ankle; I admit that each of them

should be done according to the indications. I believe there are good results from all of them, but it must be remembered that in Chopart's particularly we are liable to get an ulcerated and an elevated heel. I had never heard of Quimby's operation and am exceedingly impressed by it, and we would certainly get a lengthening of the limb. It will evidently be of value in selected cases. I admit that it is unnecessary in Syme's operation to approach the epiphyseal line, but this line can easily be overreached in young children. Of course there is no excuse in an operator so doing but such a thing will and does happen.

DR. NEWTON of New Jersey—One case of my own was sufficient to demonstrate to me the advantage of extreme conservatism. A boy about eighteen years of age had both feet frozen. About two weeks afterward I performed a double Hays' operation and kept the patient in bed three months. That was about a year ago and when I last heard from him he was doing well and earning his living at manual labor.

DR. COOLIDGE of Chicago—One important element that should be recognized in the consideration of this subject is that of the expense of procuring an artificial limb and keeping it in order. For a poor man this is quite an undertaking.

DR. FERGUSON of Winnipeg—I wish to mention the indications for operations on the foot and below the knee when necessitated by frostbite.

We have a good many cases of freezing, up in our country and amputation is frequently necessary. I have had considerable experience in that line in the past ten years and I always save all I can in front. Hay's and Lisfranc's operations have proven very satisfactory to me, and when I cannot do these I usually do Syme's and have had no occasion to regret it. Dr. Quimby's operation impresses me favorably; it should take a place in surgery, especially in cases of frozen feet and I shall try it.

DR. MANLEY—My paper was presented chiefly for the purpose of bringing out discussion on the subject. My experience has convinced me that to sacrifice the ankle joint is a very serious matter, and that it is very seldom necessary in traumatic cases. I am not familiar with Dr. Quimby's operation I must confess, not having seen it in the literature of the subject. In reference to the point of preserving the patient's life, I would say that in traumatized conditions of the foot a primary operation should not be made, but we should wait for the line of demarkation to appear.

There is no similarity between surgery in war and in civil life, and what we would do in the one should not be taken as a criterion for proceeding in the other.

The matter of the expense of an artificial limb is a very important point, but no more than one in ten cases ever wear an artificial limb.

ANALYSIS OF ONE HUNDRED AND THIRTY-THREE CASES OF HERNIA OPERATED UPON FOR THE PURPOSE OF RADICAL CURE.

Read before the Section on Surgery and Anatomy at the Forty-fourth Annual Meeting of the American Medical Association.

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It may be possible that I owe the Surgical Section of the American Medical Association an apology for inviting their attention again, at so short an interval, to the subject of hernia. However, it is not for the purpose of repeating my views which I have so recently presented in extenso to the profession, but the rather that I may analyze a little more carefully the results of my personal experience, and also that of the distinguished surgeons who have made valuable contributions upon this subject since, and briefly draw therefrom the deductions thus afforded. In my work[1] published last summer, I gave a brief review of 112 operations with the history of seventy-eight cases which I had been able to keep under observation. Of these, there were reported four relapses, and of the four, three had returned within six months from the time of operation. I have re-operated upon two of these with a perfect result. Since this published report I have operated for hernia in twenty-one cases; thirteen were right inguinal, five left inguinal, two femoral, and one omental. In two cases there was a limited breaking down of the wound. Number 133 was evidently owing to infection, and is worthy of brief comment:

Mr. F., aged 23; a strong, vigorous man, but had suffered for years from an irreducible scrotal hernia, made much more painful from the attempt to wear a truss. Section revealed that it was of the congenital variety, and the omentum was firmly adherent to the testicle nearly its entire length. Separation proved impossible without injury to the testicle, and the omentum was sutured across and divided. The operation was conducted in the usual manner, a new tunica vaginalis testis being formed. I dissected the sac to its base, sutured across and resected; closed the parts as usual. Skin wound healed primarily, but ten days after operation there was a slight suppuration at the upper portion of the wound. The testicle was not painful, no œdema of the scrotum, and the patient was almost entirely free from suffering. Otherwise, the recovery went on satisfactorily.

Number 122 is interesting in that the hernia was of long standing, and breaking down of the tissue followed from the greatly thinned and devitalized condition of the abdominal wall. It was of the irreducible scrotal variety, about the size of an infant's head, incapacitating the patient from active labor. The omentum was everywhere adherent to the sac, and the sac to the surrounding tissue. Little over one pound in weight of deformed omentum was removed. The sac was painstakingly dissected out and the injured, shreddy tissue was cut away. I closed the wound in three layers with the buried tendon suture, sealed with iodoform collodion as is my habit. The patient made seemingly a rapid recovery until quite two weeks later, when the superficial tissues softened in the upper portion of the wound with slight discharge of shreddy material. This was evidently owing to the defective vitality of the parts and not to infection. Rapid convalescence supervened and nearly six months later the report is that the parts are firm and strong.

Number 130 is also worthy of brief detail: A moderate-sized right scrotal hernia has long given suffering, being imperfectly retained by a truss. An undescended testicle is easily outlined on the left side at site of the internal ring. Otherwise the patient is a healthy man, aged 42, married with a family. I made a new tunica vaginalis testis in the scrotal tissue, having freed it from its attachment at its former site and pulled down the cord. The transplanted testicle was stitched to the base of the

[1] The Anatomy and Surgical Treatment of Hernia. D. Appleton & Co.

scrotum with a tendon suture, passing through the connective tissue of the cord just above the testicle. Sutured the newly formed canal closely upon the cord and closed the hernial opening which was direct, admitting the tips of two fingers, from below upward. The reconstructed canal was of normal length, and the wound was sealed with iodoform collodion. Primary union supervened in both wounds except a slight opening at the base of the scrotal wound of the left side, from which in about two weeks a little broken down connective tissue was removed. Testicle gives no suffering in its new situation and the result is very satisfactory. The history of the other cases contained nothing noteworthy.

During the year I have re-operated upon two cases which belong to the series reported last year as cured. As far as now known, there have been six recurrent herniæ in the 133 operations and no deaths. No truss has been advised with perhaps a single exception, where the abdominal wall was greatly thinned with slight bulging of the side, but without recurrence of the hernia. A considerable portion, quite one-third of the number have been under observation for ten years or more.

The recent literature of surgery has been exceptionally replete with reports of very many cases, almost without mortality. Perhaps the most noteworthy of the European contributions upon hernia is that of Professor Kocher of Berne.[2] In his first forty-two cases, covering the period from 1875 to 1886, the result showed a permanent cure in 83.4 per cent. with a recurrence of 16.6 per cent. Of the relapses the inference was that in four out of five of the cases, the hernial ring had not been securely closed. In his more recent report he was able to trace the history of ninety-four patients from the 119 operated upon.

His method of operation briefly described is as follows: Isolation of the sac to its very base with as little damage to the external structures as possible. The cord is not displaced from the canal. The index finger of the left hand is introduced into the canal and a small opening is made laterally from the posterior inguinal ring through the aponeurosis of the external oblique muscle. A pair of slender artery-forceps is passed through this opening and out through the external inguinal ring. The hernial sac is grasped and drawn upward through this opening and energetically twisted. It is then carried down upon the anterior wall of the unopened inguinal canal and held thus twisted by the forceps. "The sutures are passed above the twisted sac, through the oblique fibers of the aponeurosis of the external oblique muscle and the underlying muscular fibers of the external oblique and transversalis through the hernial sac itself, including the ligament of Poupart beneath it. These sutures, five to seven or more, bring together also the pillars of the anterior ring, to which the lower end of the hernial sac is fastened." The modification of procedure peculiar to the author is yet another way of utilizing the peritoneal sac, not very unlike that of Dr. Bryant of New York, which he finds may be recommended in a limited number of cases.

Kocher assumes that it is safe to conclude that four-fifths of all patients operated upon may be radically cured, that the use of the truss after operation should be exceptional, that not the slightest excavation in the peritoneum about the internal ring should be permitted to remain. He writes: "We know positively enough from our statistics, how a method which in itself is technically perfect, in case of infection amounts to positively nothing." . . . "In this manner a firm and solid pad or roll is secured over the entire length of the inguinal canal, which forms a better dam against the pressure of the intestines than an implanted patch of skin or peritoneum." He uses interrupted buried silk sutures. He emphasizes as of the first importance, the complete obliteration of the infundibulum depression of the peritoneum by the closure of the neck of the sac. It will, however, be seen that he makes no effort to reinforce the tissues posterior to the cord, or to close the deepened border of the internal ring, and thereby restore the obliquity of the canal.

Dr. G. R. Fowler of Brooklyn,[3] reviews carefully the subject of operative measures for the cure of hernia and gives the results in thirty-three operations, in which he has used a method of closing the wound of his own devising, "cross suturing" with silkworm gut.

He disposes of the sac by a free dissection quite to within the internal ring, and prefers to close it as the "ideal method" by a line of through and through sutures, in cobble-stitch fashion and resects it. The sac is held tense by an assistant and no portion of it is to be permitted to occupy the internal ring. Dr. Fowler strongly advises the method of Bassini, modified by Postempski in the disposition of the cord. This is to displace the cord towards the median line after having completely freed it from the canal, and attaching it by loose loops of catgut to the abdominal wall beneath the skin.

Dr. Fowler prefers to make a new internal ring by the dissection of the aponeurosis of the external oblique, for a distance towards the median line sufficient to permit the placing of the spermatic cord in this its new location, as far as its length will allow. In this he follows Dr. Halsted of Baltimore. The sutures are about three-eighths of an inch apart and a sufficient number are employed to close completely the wound, no drainage being used. The sutures are left in for at least three weeks. The advantages claimed for this method are forcibly put by the author as follows: "Under all circumstances in which a recurrence is favored or produced, the direction of the force is from within forwards and downwards. When the cord is made to assume a course upwards and then inwards before making its descent in the direction of the scrotum, nothing short of the patient standing on his head will favor the entrance of a portion of intestine alongside of the cord and permit it to follow its course. It may be said that the weight of the testicle will tend to straighten the cord finally; this is true to a certain extent, but the manner of placing the sutures here described will prevent this for the reason that the cord is held away from the line of incision by being placed entirely outside of these, independently of the chromocized catgut loops which fasten the cord in its new position; second, the cross-suture secures in the approximation of the edges of the divided layers separately all the advantages of the buried catgut

[2] Annals of Surgery, Dec., 1892, p. 505.

[3] Annals of Surgery, May, 1893, p. 16–27.

sutures; being removable at will, it presents none of the disadvantages arising from the uncertainty as to the length of time which the latter may be depended upon to hold securely."

Dr. Fowler never permits a patient to sit up even in bed for the first six weeks following the operation, believing profit is often obtained by prolonging the stay in bed a fortnight longer. He considers an operation for the radical cure of hernia which requires a patient to wear a truss subsequently not worthy the name.

Dr. Halsted of Baltimore, in the May number of the *Annals of Surgery*, contributed a valuable article upon the radical cure of inguinal hernia in the male. His method is essentially that of Bassini and consists in a free dissection of the parts; lifting of the spermatic cord out of the canal and closure of the conjoined tendon to Poupart's ligament behind the cord, thus reënforcing the posterior border of the canal by the union of the parts by means of a double interrupted silk suture, "the mattress suture." He makes the incision sufficiently free to expose completely the parts, closes off the peritoneum by a line of interrupted silk sutures and forms a new internal ring. In order that the ring may be made as small as possible, he isolates the vas deferens and blood vessels of the cord and excises all but one or two of the veins. He closes the skin with superficial sutures without drainage and very properly emphasizes the importance of approximating the tissues with as little constriction as possible. More recently he has closed the external wound by the use of a continuous buried skin suture of silk without knots, which is withdrawn after one or two weeks.

In advocating the advantages of his method, Dr. Halsted writes: "To reproduce the equivalent, anatomically and physiologically, of the inguinal canal is I believe impossible. Moreover, we do not know that nature has made the best possible provision against hernia in providing, as it does, for the passage of the cord through the abdominal wall. Bassini's operation, although essentially the same as my operation, is different in some respects. First, Bassini always brings the cord through the muscles at the internal abdominal ring. The point out to which I transplant the cord is determined, as I have said, by the condition of the muscles; second, Bassini does not excise the superfluens veins. I believe that it is advisable to reduce the size of the cord, as much as is practicable; third, in Bassini's operation the cord lies posterior to the aponeurosis of the external oblique muscle; in mine, between this aponeurosis and the skin. To secure for the cord the position which Bassini recommends, an additional row of stitches is required."

Dr. Halsted reports his experience in extenso in fifty-eight cases. His first operation is dated June 6, 1889. There has not been a single recurrence in his cases where primary union supervened. He mentions six recurrences due to imperfect conditions of the wound.

In the same number of the *Annals* is an extremely interesting paper, entitled, "Observations upon the Mechanical and Operative Treatment of Hernia, at the Hospital for Ruptured and Crippled," by Drs. Bull and Coley. It includes the analysis of over 9,000 cases of hernia, or affections simulating hernia, up to Sept. 30, 1892. The portion of the article devoted to the mechanical treatment is worthy of especial study, but is of course foreign to the present discussion. The operative treatment is of exceptional interest, since it marks a radical change of methods hitherto employed at this hospital, and reverses in large measure the previous views of Dr. Bull which have been so widely quoted as demonstrating that operative measures, by whatsoever method attempted in order to effect a cure, usually resulted in failure. During fifteen months, forty cases were operated upon without a death, and in thirty-eight of these absolute primary union supervened. In reference to the suture material I quote: "The kangaroo tendon was also used in nearly all of the buried sutures in the Bassini operation and it has given the greatest satisfaction. The wounds have all healed by first intention, and there has been no tendency to the formation of sinuses as frequently occur when silk is used, and to a less extent with silk wormgut. The kangaroo tendon and the ox peritoneum seem to fulfill all the requirements of a buried suture in a hernial operation." . . . . "The propriety of operation has been amply justified by its slight mortality and its incontestable benefit in cases of strangulated and irreducible hernia. Even after relapse the majority of these patients find themselves better than before the operation. The reappearing protrusion is smaller than the original rupture and a truss is worn with greater comfort. An exception is to be noticed only in a few cases of relapse after the open method, or in those where, after other procedures, prolonged suppuration has followed.

These considerations lead to the conclusion that all open methods of operation, after which the wound is left to heal by granulation, should be discarded, and that *the feature* in every operation which is to give satisfaction should be *rapid primary union*. If this latter statement be accepted, we should further discard all methods in which foreign bodies, even though aseptic, silk and silver wire for instance, are buried in the wound."

In a letter from Dr. Coley, assistant of Dr. Bull under date of May 23, he states: "I feel greatly indebted to you for the kangaroo tendon suture and your efforts to make known its virtues. It seems to be the ideal suture for hernia. I introduced it at the Hospital for Ruptured and Crippled, and afterwards persuaded Dr. Bull to use it in the New York hospital. I have operated upon forty-four cases in children, mostly during the last year. With my adult cases at the Post Graduate, I have operated nearly sixty times and have had more than fifty cases of primary union. In fact, have never failed to get primary union where I have used the kangaroo tendon."

The progress of modern surgery is emphasized upon every hand, and the prophesy which I made years ago that the cure of hernia was no exception, is being widely fulfilled. The older anatomists understood quite as well as ourselves that, in the normal relationship of the parts, the inguinal canal is always disposed in a direction at or near a right angle to the intra-abdominal pressure, and in the maintenance of this is the principal reason why all males are not subjects of hernia. It is quite probable that the primal predisposition to hernia is owing to an arrest in the processes of development, which finds its minor expression in the infundibulum process, in the attachment of the peritoneum to the spermatic cord about the internal ring.

When we remember the late period of intra-uterine life at which the testicle descends into the scrotum, and the closure of the peritoneum about the cord takes place, we can easily understand why the parietal peritoneum at the internal ring usually presents a depression. This is often very considerably pronounced in men who have never suffered from hernia, the strong aponeurotic structures which close the internal ring having been sufficient to retain the intra-abdominal pressure at its normal angle. Change, however, the direction of pressure sufficiently to permit the wave-like impulses of the intestinal contents to impinge within the infundibulum, and little by little the barrier produced by the transversalis fascia yields; the internal ring enlarges by a depression of its lower border until gradually the line of intra-abdominal pressure becomes more or less parallel to that of the canal; the abdominal wall gives way under some sudden impulse and the patient recognizes that he is ruptured. That which seems to him a sudden accident is the result rather of a series of causes acting through a considerable period.

If we are correct as to causation, the study of which is of the greatest importance, it becomes us that we consider the essential factorage which must enter into the problem in any operation for cure. Although seemingly so simple, it will be found that the equation is a varying one, depending largely upon personal conditions which are ever subject to modifications. These may be grouped in a general way as follows:

First, intra-abdominal pressure; second, the condition of the abdominal wall; the development and tone of its muscles and connective tissue; the amount of fat; the size of the cord, which is oftentimes very greatly increased by enlarged veins; third, the pathological changes in the peritoneum; the sacs containing the hernial tumor which are most varied in character, demanding for the exhaustive treatment of this part of the subject a chapter longer than this entire paper; fourth, contents of the sac: the constituents of the hernial tumor, a condition of almost endless variety of detail which must be passed over without comment.

There is at the present time a general consensus of surgical opinion, that the contents of the hernial tumor having been disposed of, the sac itself must be treated in great measure as a foreign pathological body. Nearly all operators agree that in pronounced hernia it should be dissected free quite within the internal ring and by some method closed so as to minimize as far as possible the infundibulum process. Mr. Macewen, by the use of the whole or a part, proposed to return it within the ring in a manner to press from without inward and forward; to buttress, so to speak, the weakened internal inguinal ring by it. This was a wise disposition of the parts before it was thought practicable to reënforce in any way the posterior border of the inguinal canal and close from below upward the internal ring. Other operators contented themselves with twisting, ligating, or suturing in order to make tense the peritoneum about the ring. Dr. Bryant of New York, advocated in addition to this, the division of the sac and interweaving it between portions of the abdominal wall, so to speak, using it as a vitalized suture. This, however, proved disastrous in a number of cases, because of the impairment of the vitality of the parts from cutting off the circulation at the base which caused sloughing, and it has been practically abandoned by its distinguished author.

I have already given a brief resumé of Professor Kocher's method, who endeavors to utilize the sac in a somewhat similar way by forcibly twisting it upon its base, and when thus twisted to its very end, attaching it by sutures to the undivided external abdominal wall. I have been unable to gather from his paper the number of his operations performed after this method which, although carefully illustrated by a series of drawings, is referred to as his more recent device. His results as tabulated are admirable and yet evidently not all performed in this way. It is clearly apparent that, in a very considerable class of hernia, for instance the large old direct-irreducible hernia, this method would be inapplicable. By it, it is impossible to re-enforce and strengthen the structures posterior to the inguinal canal; to reform the internal inguinal ring; to restore the obliquity of the canal and change the line of intra-abdominal pressure.

Bassini's method is worthy of careful analysis and in all its essentials is not unlike that of mine. It is doubtless true that this distinguished Italian surgeon worked out the problem utterly independently, without knowledge of my labors in this direction, although my first publication upon this subject antedates his by quite fifteen years. By a free dissection the base of the sac is closed in an oblique line quite within the border of the internal ring, the cord is lifted from its canal and held upon the inner side by an assistant. The posterior border of the conjoined tendon is brought in apposition to Poupart's ligament by a line of continuous catgut sutures and closed from below upward quite upon the cord at its exit from the internal ring. The cord is then replaced and the strong aponeurotic fibers of the conjoined tendon and Poupart's ligament are closed down upon the cord by a similar line of continuous suturing, until the external ring is reformed. Suturing of the skin completes the operation.

Dr. Halsted's modification of Bassini's operation is different in that the cord is placed entirely external to the rejoined oblique muscle, re-enforcing posteriorly a new inguinal canal by all the strong structures that go to make up the abdominal wall. A new canal is constructed in the tissues just beneath the skin; although thus re-enforced Dr. Halsted thinks it is important to isolate and cut away all but one or two of the veins of the cord in order to reduce its size as much as possible.

Postemski has modified the Bassini method, apparently ignorant of Halsted's procedures, but differing from them in that he forms a new internal ring, one-half an inch or more above the upper border of its former site, and attaches the cord by loose catgut sutures to the connective tissue toward the median line external to the fascia of the great oblique muscle.

Dr. Fowler has still further modified this procedure by carrying the site of the internal ring as far as the length of the cord will permit, an half inch or more, above its former location and reversing the direction of the cord through the abdominal wall in its entrance into the abdomen. Thus the cord is carried forward and inward and held by loose catgut sutures to the fascia of the external oblique muscle, while the abdominal opening, represented by its

former inguinal canal, is obliterated in its entirety and closed by a double row of figure-of-eight silkworm gut sutures.

History is said to repeat itself. Heliodorus describes an operation essentially like these latter methods under discussion. After him the evolution of the problem went on little by little, until it was safely worked out by the elimination, not alone of the inguinal canal and the redundant veins of the cord, but also the entirety of this troublesome complication was removed, and cures were easily effected at wholesale; castration being first performed, although the operators were in blissful ignorance of our troublesome painstaking antiseptic technique. In tracing the results of these innovations it is an interesting, although I grant a subordinate question, to ascertain the integrity and usefulness of this organ oftentimes overestimated in its physiological value.

Levity aside, it is important to follow the deductions which should guide us in the safe solution of the problem, and this to most minds would seem answered in restoring the parts to their normal anatomical and physiological relationship. Thus I assume that the inguinal canal, normally developed is long enough to make the internal abdominal pressure at a right angle of to its axis, and when this is effected little if anything further can be gained by the transplantation of the cord to a higher point through the abdominal wall. The upper border of the internal inguinal ring remains a sure and safe landmark for the fixation of the spermatic cord.

Mr. Cooper pointed out the extraordinary reenforcement of the transversalis fascia which normally fixed the internal ring and formed the posrior border of the inguinal canal. This is usually re-enforced also by a portion of the transversalis muscle. The great lateral protecting walls of the canal, as every anatomist knows, are made up, upon the inner border by the conjoined tendon, and upon the outer by Poupart's ligament. The thick fascia from the oblique muscles covers over the cord, making its external envelope. The lower edge of these reflecting fibers forms the external ring. Thus the cord lies easily movable in a fixed, firm canal, although its strong borders are subject to a considerable variety of changes.

It seems that the solution of the problem for the cure of hernia must be the restoration of the parts to their normal standard if possible. This was the problem which I set before me for solution quite twenty years ago. In order to accomplish it, it is clearly evident that the peritoneal sac must be entirely removed. Since the hernia has its origin in the deformation and shortening of the posterior wall of the canal, it seemed equally clear that some method must be devised for its reconstruction and restoration. This demanded a free dissection; first to deal properly with the contents of the sac; second, to free quite within the ring and eliminate this deformed peritoneal pouch. This having been effected it was a natural deduction that the posterior wall of the inguinal canal must be reformed, but to accomplish this, suture material must be used which could be buried in the tissues and there remain undisturbed. If arteries could be ligated with catgut, and the subsequent intervening processes show the constricted vessel surrounded by a newly-formed connective tissue band, replacing the ligature, the inference was that this material might serve a similar purpose when applied for closing the internal ring and reconstructing the posterior wall of the inguinal canal. This method I put in practice more than twenty years ago and published the results, being the first to advocate the advantages derived from the use of the buried animal sutures.

Having reformed the internal ring and the posterior border of the canal, there only remained the closure of the wound in order to effect the complete restoration of the parts to their normal relationship. This I have long believed is best effected by approximating the tissues in an even layer by means of the double continuous tendon suture.

To master the problem as thus outlined, the technique of the operation must be conducted with the most careful antiseptic measures, since otherwise primary union i the exception rather than the rule, and when suppuration ensues, the operation is followed not only by an almost necessary failure, but with a possible risk of life. But in these precautions I happily found safety owing to the early personal training received from the great master of antiseptic surgery. Ambitious operators very properly desire to improve upon previous measures, and probably to this more than any other cause, the profession is indebted for a great variety of detail, worked out with much enthusiasm, and a vast amount of clinical experience by which the subject has been greatly enriched.

If the essential factors are as above outlined, and the experience of a multitude of workers under improved methods is accepted as testimony, conservatively the verdict may be rendered; that inguinal hernia in the male can be safely and permanently cured; so safely that the collated experiences which within a year I have myself made of over 3,000 cases of hernia, operated upon, shows less than 1 per cent. of mortality. The results in the hands of these operators have been satisfactory, so satisfactory that from 80 to 90 per cent. are declared cured.

The surgical measures are not severe; the later operators declare that under modern aseptic precautions not more than 5 per cent. of the wounds fail of primary union. Even where cure has not been effected, in a great majority of the cases the condition of the patient has been much improved. The essential factor in addition to those above stated is, a wound in *aseptic* tissues, *aseptically* made and maintained. For reasons which I have emphasized elsewhere, there is great advantage in the use of buried animal sutures, preferably tendon, but whatever the material employed, the tissues must not be overconstricted, since approximation and retention at rest of the structures as little devitalized as possible are important factors in securing primary union in even an aseptic wound. The only dressing which seems entirely adequate and which also approaches the ideal, is the iodoform collodion seal which necessarily prevents infection entering the wound, while drainage is dispensed with and no sutures have to be removed.

I have no hesitancy in commending to the profession these measures, which generally are applicable to all wounds aseptically made, as the really essential factors which pertain as fundamental in the cure of hernia.

In reviewing the recent literature of the subject it has given me intense satisfaction to find that the fundamental principles of the operation, for which

I have so long contended, have been finally accepted and carried into practice by many of the most distinguished surgeons of Europe and America. It is with the utmost confidence that I contemplate the surgical relief which will be given to the great army of truss-bearing sufferers in a not distant future.

A STUDY OF THE RADICAL CURE OF HERNIA BY MARCY'S METHOD.

WITH A REPORT OF EIGHT CASES INCLUDING OPERATIONS.

Read before the Gynecological Society of Boston.

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The operation for the radical cure of hernia consists in the treatment of the viscera, peritoneal sac, the opening in the abdominal wall, and the incision of the skin.

Marcy's operation differs very materially from all others in three important respects, viz: the manner of suturing the rings with a perineal needle, taking a shoemaker's stitch; the suture material, kangaroo tendon, a non-irritating, easily made aseptic material which is very strong and capable of resisting absorption and softening for a very long time, sufficiently long for the complete metamorphosis of a plastic exudation into firm connective tissue; the restoration of the obliquity of the inguinal canal by a free dissection of the canal, the elevation of the cord, and the tight closure of the internal ring below it, the dropping of the cord, and the reformation of the canal by drawing together the tissues from either side over the cord with tendon and the shoemaker's stitch.

The advantage of the manner of stitching consists of the close apposition into which it brings tissues, the breadth of the opposing surfaces it affords, and the material thickening it produces in the already thinned-out abdominal wall.

The superiority of kangaroo tendon over silk as a buried suture depends on its being less irritable and less likely to act as a foreign body with the formation of a sinus, and slow healing. Although silk has been used successfully as a buried suture by many masters in surgery, there is evidence of its causing harm at times in an apparently aseptic wound. Catgut is absorbed too quickly unless over-chromicized, and then it may act as an irritant. All sutures which are brought out upon the skin surface for final removal, cannot be compared with the buried material, because they are removed early and leave the plastic exudate without support, then absorption as a rule rapidly occurs. There is none, or but little connective tissue formation, and the old breach may quickly re-form, within six weeks after the primary operation.

Three months after burying the tendon in the second operation, in case 2, it was removed in apparently the same condition as when inserted, and five months after the primary operation, tendon was removed in short pieces, which was pale in color, soft, somewhat thickened, easily broken, but retained its original shape. In both instances the tendon was surrounded by a dense mesh-work of connective tissue which was sufficient evidence of round cell infiltration that had undergone complete metamorphosis.

The restoration of the obliquity of the canal affords the natural means for strengthening the parts and helps to prevent a recurrence of the hernia.

An incision is made in the skin over the inguinal canal, and in the same direction, between three and four inches in length; the opening is widened by dissecting up with the fingers the skin and superficial fascia on either side, and the cord exposed. The canal is then opened by passing in a director above the cord and cutting with a scalpel the outer wall. It should be opened way to the top. The cord should now be separated from its attachments and drawn out with the sac, which in small indirect herniæ is usually found empty and concealed beneath the infundibuliform or fascia propria of the cord, so as to expose the rings.

When the gut is strangulated, the sac is carefully opened with the aid of a director and the internal ring cut above. Gerster's suggestion to cut the constriction from without inward instead of from within outwards is an especially valuable one. The gut is further drawn out and very carefully inspected before it is returned to the abdomen. If the peritoneal coat is smooth and shiny, the gut may be put back into place and the sac, if free from adherent omentum, closed with sutures passed through the neck. When there are adhesions between the omentum and sac they should be broken down and the bleeding points tied with animal ligature. If the omentum is deformed with many adhesions, which when separated leave large raw surfaces, with many bleeding points, or is reduced with great difficulty, perhaps only by enlarging the ring, to sew it off near the abdominal opening with a shoemacker's stitch, so as to include all the vessels, cut away the protruding portion, and close in the raw surface with an over-and-over stitch, may be considered better surgery than the reduction of the mutilated part.

If gangrenous changes have started in the gut, as indicated by the roughened peritoneal coat and greasy sensation to the touch, there are three ways of proceeding: when in a doubtful condition, enlarge the opening in the abdominal wall sufficiently to allow free circulation in the gut, draw further out the strangulated coil so as to expose about an inch that is in a normal condition, pack aseptic gauze lightly about and under the coil so as to prevent the spontaneous return of the bowel, and keep the parts covered with sterilized hot wet cloths wrung out of a normal salt solution. In this manner the changes in the circulation of the strangulated gut may be watched for several hours if necessary, during which time the patient is maintained under ether narcosis, and, if the circulation shows signs of returning in the strangulated portion by a change of the dark color to a paler, redder hue, the parts may be immediately repaired.

When gangrene of the gut has taken place, one can resort to a resection with the formation of an anastomosis by some one of the various perfected methods, or an artificial anus may be made, and the gut sewed into the inguinal wound, or the gut can be fastened with a few stitches to the edges of the opening and after dressing the wound aseptically, left to the care of nature. In either case the prognosis is very bad and depends as much upon the condition of the patient at the time of operating, as upon the severity of the operation *per se*.

The treatment of the sac is a very important matter and, as a rule, the most difficult part of the ope-

ration for a radical cure. It should be dissected out in every case where it is possible to do so except in young children, and all traces removed from the edges of the internal ring. As it lies flaccid in the canal the sac can hardly be distinguished from the elements proper to the cord, and it must be opened near the neck by a careful dissection with a director and scalpel, while one bears in mind that it may be confined in the sheath of the cord, under the fascia propria, then separated all around from the tissues forming the internal ring, and finally stripped off from the cord and other adhesions, from the neck downward, that one may be sure of its complete removal from the hernial canal. The sac should then be freed from any contents, the neck sewed off, the remains excised, and the stump dropped into place. Unless this is properly done there will be a peritoneal pouch that extends into and acts upon the canal every time there is any abdominal straining, very much like a bag of water before the advancing head during parturition, which finally may effect a dilation of the rings and reproduce the hernia. This is due to the fact that if the sac is not entirely separated from the internal ring and sewed off by itself the complete closure of the neck is attended with great difficulty and one has no means of determining that a small pouch is not left immediately beneath the cord, or that a part of the sac is not included in the sutured edges of the internal ring. When the sac is not entirely removed from the hernial canal it becomes a weak point in the operation for radical cure to the hernia and was the probable cause of failure in many of the earlier operations, especially those where the ring was closed without making an incision in the skin.

The final steps of the operation consist in closing the internal ring tightly with a line of shoemaker stitches, starting from the lower margin of the ring and working upward; the closure of the external ring after the cord is dropped back into place, by drawing together the tissues on either side, with an over-and-over stitch, so as to cover over the cord; the approximation of the edges of the skin wound with a continuous buried suture; and the sealing of the line of incision with collodion reinforced by a few fibers of absorbent cotton.

Case 1.—Clarence S., age 41 years, has had an oblique inguinal hernia for twenty years on the right side for which he has worn a truss fourteen years, and on the left side he has had a similar hernia for four years. A short time before operating the gut had slipped down the canal and was returned only with great difficulty under narcosis, and at the time of operating a bunch was found in the groin which proved to be strangulated omentum undergoing a process of suppuration.

Operation Nov. 20, 1891. The right side was treated by dissecting up the cord and closing the rings without interfering with the sac; the incision in the skin was repaired in the usual manner. On the left side the sac, including omentum, was tied off at the neck and the canal and skin closed except at the lower angle, where a strand of tendon ligature was brought out to act as drainage.[1]

The wounds healed quickly, all but the open end on the left side, by first intention, and for about four months there was an apparent cure, when the abdominal wall began to bulge at the inguinal rings on both sides and soon afterwards the herniæ were reproduced.

May 9, 1892, the case was again operated upon, this time by Dr. Marcy, who closed the rings and wound without dissecting out the sac. Both wounds healed by first intention, but in from four to six weeks after the operation small multiple abscesses formed at the site of the incisions, which would discharge, rapidly heal, and then break down again. They did not appear like ordinary abscesses, but more like a retrogressive degeneration of tissue without inflammatory changes. Treatment by antiseptic cleansing and dressing did not apparently modify the course of this trouble, but as soon as a truss was applied with pressure it immediately ceased. However, before this measure of relief was adopted, the abdominal wall became quite thin from the breaking down of tissue, and although by wearing a truss the patient experienced no trouble until fall, a direct abdominal hernia then developed above the cord, near the upper limit of the internal ring but unconnected with it, on the right side.

To relieve this last trouble a third operation was performed by Dr. Marcy, Feb. 14, 1893. The sac was opened and found to contain adherent omentum; this was freed from its adhesions and a large portion sewed off and removed. The sac was tied at the neck and the stump returned to the abdomen. The operation was finished in the usual manner. Healing occurred by first intention, but at the end of a month the tissue again began to break down the same as after the first operation, and the patient was advised to wear a supporter with a large hair pad. May 1, a small abscess formed and since the patient has been free from trouble. July 15, there was an apparent cure.

Case 2.—An oblique inguinal hernia in a feeble male child 3 months old. Operation Dec. 8, 1891. The cord was raised and the ring closed by a simple over-and-over stitch. The collodion dressing became loosened from the action of urine at the end of two days and was removed, the skin carefully cleansed with a bichloride solution and dried, and a fresh collodion seal applied. Healing occurred by first intention and resulted in a radical cure of the hernia.

Case 3.—Charles G., age 40 years, has had an old oblique inguinal hernia on the left side. Operation Feb. 2, 1892, without excision of the sac. Healing occurred by first intention and it looked for a while as though a radical cure would be the result; in July, however, there appeared a swelling over the ring which seemed to indicate a return of the hernia, but which slowly disappeared and the patient did very well until March, 1893, when the parts were strained severely by coughing and lifting and the hernia was reproduced.

Case 4.—Arthur B., age 27 years, has had an oblique inguinal hernia on the right side since childhood. Operation June 15, 1892. The ring was closed without interfering with the sac, healing occurred by first intention and a radical cure of the hernia followed.

Case 5.—William S., age 25 years, has had an oblique inguinal hernia on each side for some time and for which he has worn a double truss. Both sides were operated upon for the closure of the ring without the obliteration of the sac, August 1, 1892, and healed by primary union. The right side was radically cured, but the hernia on the left returned and a second operation was performed Dec. 8, 1892. The sac was untouched, but the canal was carefully opened and the ring sewed up tightly about the cord so as to shut off the lumen of the sac at the neck. About six weeks after the operation the patient slipped on the ice, and in the attempt to save himself gave the side a severe wrench, which immediately opened the ring and let the gut down. A third operation was thereby necessitated and performed March 9, 1893. This time the sac was opened, dissected out, ligatured and removed and the smooth edges of the internal ring, very much thickened by the former operations, were scarified and tightly approximated; the canal and skin wound were closed in the usual manner. The parts healed by first intention and there is every reason to expect a radical cure.

Case 6.—Leah G., age 55 years; married but never has been pregnant; has had an inguinal hernia for five years. The sac was a large one, extending as far as the labia and united to the surrounding tissues by firm adhesions. Strangulation occurred Feb. 28, 1893, and continued six hours and till the time of operation. The gut was found deeply congested and of a bluish hue, but with a smooth glistening peritoneal coat. It was returned to the abdomen, the sac carefully dissected out and excised, and the operation finished in the usual manner. Although careful aseptic and antiseptic precautions were used, the wound became infected and healed by a slow process of granulation, which was greatly retarded by the presence of the deep buried suture; however, the case finally recovered and the hernia has shown no evidence of returning.

[1] As buried tendon or animal ligature of any kind will almost always cause trouble in a septic wound and sooner or later have to be removed unless early absorption takes place, it must be considered a bad practice to drain a wound in this manner. If there is any question about the aseptic condition of the wound, it is better not to use a continuous suture nor to bury it so that it can not easily be removed in case of necessity. To drain an aseptic wound in this manner offers an unnecessary path for possible infection.

Since writing the above I have operated on two cases:

Case 7.—Richard S., age 47 years. On the left side he has suffered from a direct inguinal hernia for nearly one year and April 20, 1893, another suddenly developed on the right side. Two days later both sides were operated on and the sac carefully dissected out and excised, primary union occurred and promises well for a radical cure.

Case 8.—Alley S., age 11 years, was seen July 2, 1893, with a strangulated inguinal hernia complicated by an undescended testicle, which lay directly in the canal. The gut was returned to the abdomen with some difficulty under narcosis and then it was found impossible to wear a truss owing to the presence of the testicle. Therefore it was deemed best to make an incision, sew up the ring, and if possible, bring the testicle down into the scrotum. The tunica vaginalis, testicle and cord were dissected out *en masse*, the ring closed without opening the sac, the tunica opened and its contents inspected, the cord stretched as much as possible, a pocket made in the scrotum by inserting into it the fingers, the testicle and its tunics were partly brought down and the skin of the scrotum was brought up until the parts were nearly in their normal relation and fastened firmly by a suture that passed through the skin at the bottom of the scrotum and the cut edges of the tunica, and brought the bruised surfaces of these membranes into close apposition. The parts healed by primary intention, and as a result of the swelling and subsequent absorption natural to the process of repair, the traction exerted by the scrotum in seeking its normal position and perhaps the aid rendered by the force of gravity the testicle has descended still further, and at present is in a position out of harm's way. It is too early to decide the question of cure of the hernia.

In reviewing the above cases the value of excision of the sac is at once manifest; some cases cannot be cured without this procedure and there is always a great risk of a return of the hernia where the sac is left. The difficulties in cases one, three and five, came from this source; the excision of the sac on the left side in case one, was performed after a ligature had been passed simply about the neck and therefore the adherent omentum was contained between its cut edges and prevented proper union. In young subjects the hernia is usually of the nature of the congenital variety and the simple closure of the ring pinches the neck of the sac together, sets up a local irritation, and promotes the natural obliteration of the communication between the cavities of the peritoneum and tunica vaginalis.

THE NEW TREATMENT OF HERNIA.

Read in the Section of Surgery and Anatomy, at the Forty-fourth Annual Meeting of the American Medical Association.

BY ALEXANDER DALLAS, M.D.

NEW YORK.

In venturing to call your attention to some new points in the treatment of hernia, I assume that you are all familiar with the methods now in use and the unsatisfactory results obtained by them. With our 3,500,000 of cases of hernia in this country—a ratio of thirty cases to every practicing physician—the great importance of the subject is self-evident. Of this large number, over 80 per cent. are inguinal and my remarks will refer more particularly to that variety.

The treatment of hernia may be divided into, first, the palliative; second, the mixed; third, the treatment of strangulated hernia; and fourth, the "radical cure."

First, the Palliative.—The palliative or mechanical treatment of hernia includes all measures used to prevent the descent of the hernial protrusion, but more particularly, the employment of trusses of various descriptions.

To the general practitioner this is, unquestionably, the most important method of treatment, for all cases of hernia are first seen by him and every case of rupture at some period of its existence is subjected to palliative treatment. It behooves him, therefore, to thoroughly acquaint himself with the principles underlying palliative treatment, to recognize its limits and to know how best to secure the most satisfactory results. And, yet, few practitioners know anything about trusses; fewer still know how to apply them, for they carelessly delegate these important duties to the druggist's apprentice or the truss vender.

Truss treatment, it should be clearly understood, is purely mechanical and its full benefits can only be secured by careful personal supervision. In *congenital* hernia, the exclusion of all foreign bodies from the vaginal process of the peritoneum permits of the contraction and obliteration of the canal which would otherwise naturally have occurred and a cure is speedily effected. In *acquired* hernia, before the sac has attained a separate existence of its own, the pressure of a properly adjusted truss restores the peritoneum forming the sac to its natural situation, the cavity of the sac is effaced and the peritoneum recovers its former polish and elasticity. In this way, cures sometimes take place in adults but can hardly be expected in old people. When the sac has acquired an independent existence, the action of the truss is still purely mechanical. By preventing the entrance of gut or omentum, it places the parts in the most favorable condition to undergo those changes of gradual contraction and obliteration by which all hollow parts of the body adapt themselves to their contents.

To insure success in "palliative treatment," it should be commenced as soon as a disposition to the formation of a hernia is detected. By the prompt initiation of treatment and its judicious continuance under the personal supervision of the surgeon, many cures can be effected where failures are now the rule. This is particularly true in the hernia of childhood where palliative measures are almost invariably sufficient to effect a cure.

Of equal importance is the selection of a proper truss. Some claim that there is no lack of good trusses in this country but a very limited practical acquaintance with them will prove how utterly erroneous this statement is. A good truss should be light, so as not to burden the patient; strong enough to prevent protrusion; sufficiently elastic to follow the abdominal movements; firm enough not to be easily displaced; so arranged that it does not press injuriously upon important organs nor interfere with the movements of the body; and so adjusted that it presses directly over the internal ring and is retained there. This latter is, unquestionably, the most important point in all truss treatment for, if the internal ring be not permanently closed, all hopes of a cure can be abandoned. To make effective pressure there should be a back pad as well as a front pad so as to secure greater accuracy with less pressure. Each hernia should have the truss specially adapted to it; the pad and the spring should be regulated by the case. It should be inspected at regular intervals and the pressure increased or diminished as the case may demand. And the surgeon should remember that after the unavoidable inconvenience of the first few days, any further pain or discomfort is unques-

tionably due to an ill-adjusted or improperly made truss and its continuance is unnecessary cruelty.

A careful examination of the trusses now in use will at once show how imperfectly they meet these indications. Many of them are burdensome by their weight while most of them are unnecessarily strong, causing atrophy of the parts against which they press. They all interfere with the movements of the body and are themselves kept in constant motion, causing painful excoriations of the skin. Not one of them can be *retained* over the internal ring, for they all gravitate downward until they rest upon the pubic bone. As a result, they exercise injurious pressure upon the spermatic cord, giving rise to severe pain and discomfort and inducing a nervous irritability which gradually undermines the system. In all of them, the pressure of the pad upon the external ring is upward and backward, causing pouting of the internal ring, thus predisposing to the constant presence of a bubonocele and preventing the possibility of a cure.

In an endeavor to overcome these objections, I here show you a truss which I have been using for several years and which has given me more satisfaction than any I have tried. It is light and cool. It rests upon the crest of the ilium, an immovable support, and is not affected by any of the movements of the body. There is no constricting band around the hips to cause atrophy of the muscles and to interfere with every motion. As a result, there is no incessant disturbance of the pad, and consequently no excoriations to heal up. The belt passes down the sides of the abdomen, closely hugging the abdominal walls, thus breaking the lateral recoil of the intestines which causes the protrusion, and acting as an auxiliary to the pad. The pad, itself of hard rubber, is small and somewhat quadrilateral in shape; its lower outer angle cut off to fit into the fold of the groin; its surface flat or slightly concave, to adapt itself to the convex abdominal walls. Running from the center of the face of the pad to its lower edge is a gradually deepening groove which prevents compression of the spermatic cord. The pressure exercised by this truss being applied from above downward, is slight, comfortably borne and directly over the internal ring and upper part of the canal; and it is the only truss by which pressure can be retained there. Another important feature is its ease of application. Once properly adjusted, it can be taken off by the patient and reapplied without fear of displacement, a fact which cannot be said of any other truss with which I am acquainted. As all spring trusses should invariably be removed at bed-time, to be reapplied on getting up, the importance of this will be readily appreciated.

When the truss has been applied the medical attendant seems to think that his work is done. As a matter of fact, the real treatment of the case has just commenced if he expects to obtain a cure. The patient should be kept under the surgeon's supervision and should be carefully examined at regular intervals to assure himself of the perfect retention of the hernia as well as, in the case of children, to provide for their rapid growth. Perfect cleanliness should be preserved, and all causes that operate to prevent or retard nature in her efforts at repair should be removed. The digestion should be carefully looked after. Constipation should be prevented. Vomiting or straining from any cause should be avoided, as well as excessive bodily exertion, and where the patient is obliged to make any considerable effort he should be taught to support the pad with his hand. The persistence of any of these causes may hinder or even completely destroy all chances of cure directed solely to the hernial protrusion.

At the same time, efforts should be made to develop and strengthen the weakened tissues by massage, electricity and gymnastic movements of various kinds. No spring truss should ever be worn in bed. In most cases it is unnecessary, in all it is harmful. When it is considered desirable to have some support, as in children, the truss should be removed at bedtime and replaced by a "hank truss" or home made bandage.

Second, the Mixed Treatment.—When, after a fair trial, the palliative method of treatment has failed other measures have at various times been tried, but the uncertainty of their action and the temporary character of their results have caused them to pass into disuse. To obviate these difficulties I have devised an instrument which is applicable both in inguinal and femoral hernia. It is simple in its application; it is definite and exact in its results; it is entirely free from danger, and the confinement necessitated by its employment is of short duration. The patient's consent can be readily obtained and its use can be safely recommended in all suitable cases. Finally, its results will compare very favorably with those of other and more dangerous measures. The instrument consists of a head and shaft or handle. The head is flattened and its point smooth and blunted. Its anterior and posterior surfaces and outer edge are covered with fine needle pointed projections while its inner surface is smooth and occupied by a deep groove. The cover of the shaft is movable, and while the instrument is being introduced is pushed forward so as to cover completely all the serrations, and present a perfectly smooth rounded surface. In operating, the parts are prepared in the usual way, while the instrument is rendered thoroughly aseptic by boiling. Twenty to thirty drops of a 4 per cent. solution of cocaine are injected into the field of operation and a transverse incision one inch long is made through the integument just below the external ring. The fascia is carefully separated and the spermatic cord gently lifted towards the inner wall of the canal. The instrument is now introduced, the groove turned towards and embracing the cord and cautiously insinuated through the canal until its point is felt free in the abdominal cavity. The shield is now removed and the instrument slowly withdrawn during which the whole interior surface of the canal, except the portion covered by the groove, is abraded and freshened. The surfaces are pressed together as the instrument is being withdrawn so as to prevent any unnecessary effusion of blood; the external wound is closed and sealed with iodoform collodion; a firm compress is placed over the canal and retained in position by strips of plaster and a bandage; and the patient is kept in bed for a few days until all local tenderness has passed away. By this simple method we at once secure complete agglutination of the walls of the canal and consequently a firm and permanent cure without pain and with only three or four days confinement to bed. A light truss with a grooved pad is then adjusted and the patient allowed to go about. At the end of two or

three months the truss can be discarded, the measures already described being used meantime to strengthen the parts.

This operation is applicable in all *recent* cases of acquired inguinal and femoral hernia and in all cases of congenital hernia, even of long standing. (It can be used in any case where the canal has not become obliterated by the pressure of the protruding viscera.) In femoral hernia the incision is made over the saphenous opening, the groove is turned toward the femoral vein and, in the after treatment the leg should be well supported. In the cases in which I have used it the results have been most satisfactory and entirely successful. By the early and judicious employment of these two methods much good may be accomplished and the necessity for radical interference can in the future be largely limited to long standing hernial tumors of large size, associated with adhesions or other complications.

Third, the Treatment of Strangulated Hernia.—The sudden onset of strangulation, with the dangerous and alarming symptoms accompanying it, invests these cases with an interest and importance to the surgeon which cannot be over estimated. Measures, therefore, for its reduction should be immediately adopted and should be persisted in until relief has been secured. Many lives are sacrificed every year by improper treatment and delayed interference. The measures usually employed now are anæsthetics, taxis and herniotomy, although other adjuvants are sometimes used.

Now the administration of an anæsthetic requires the presence of an assistant and it invariably produces more or less depression; while its long-continued use is never free from danger. It is generally followed also by more or less vomiting; and it is sometimes difficult to determine whether the persistent vomiting is due to this or depends upon imperfect reduction of the hernia. In regard to taxis as ordinarily used, its employment is extremely hazardous. All authorities agree that the frightful mortality which now exists in cases of strangulated hernia is directly attributable to violent, ill-directed and protracted taxis, and to the consequent delay in operating. Cold, in the shape of ice-bags, etc., although strongly recommended, endangers the vitality of the already enfeebled tissues, and should never be employed, while hot applications can be used with safety and are far more agreeable and beneficial to the patient. Ether irrigation is sometimes used although Finkelstein, its chief advocate, only claims 53 per cent. of successes in cases of enterocele; in epiplocele he admits it is of no value.

Even in the hands of experts, the results of all these measures are unsatisfactory; hence, a method of treatment which is free from the disadvantages and dangers of those now in use, which is so simple that any one can use it and so successful that all cases yield to it, must commend itself to the favorable attention of the profession. For fifteen years it has been under test and so far there has not been a single failure. The patient is placed in the recumbent position, the hips raised, the knees bent on the body and the tumor supported. A hypodermic injection of morphia $\frac{1}{4}$ grain, atropia $\frac{1}{120}$ grain, cocaine $\frac{1}{6}$ grain, is at once given in the neighborhood of the rupture, and repeated every fifteen minutes until the patient is comfortable. Meantime, he is made to drink, every five, minutes from two to four ounces of a hot mixture consisting of: strong black coffee one pint; fluid extract of ergot two to four drachms, and when the pulse is weak and compressible, strychnia $\frac{1}{30}$ grain. At the end of half an hour the rupture has become flaccid and disappears, or gentle manipulation reduces it. I have never had to give the second dose nor have I had to wait over half an hour to secure reduction, while the necessary manipulations never exceeded two minutes. No anæsthetic was ever used or required. If, however, there should be no change in the tenseness of the tumor the same quantity of the mixture should be given during the next hour and, if reduction cannot then be effected the knife should at once be resorted to.

The advantages of this method of treatment are obvious. By the injection the pain and distress are at once alleviated and confidence inspired, an important item in these cases. At the same time gastric irritability is allayed and vomiting becomes much less frequent or even ceases, while the muscular tissues freed from irritation become relaxed. The fact that no anæsthetic is required is a decided advantage, for it prevents the employment of excessive and long-continued taxis and the injuries arising from it. At the same time it obviates the depression which its administration causes. The amount of taxis necessary for the reduction of the hernial tumor, after the administration of this mixture, is so slight and of such short duration that no injury can be inflicted upon the contents of the sac and reduction *en bloc* is impossible, while if operative measures are immediately resorted to on failure of the second attempt no unnecessary delay will be incurred and mortification of the bowel will become a rarity.

The fatal delay in resorting to operative interference is mainly attributable to the fact that many medical men do not seem to realize the dangers incurred by a continuance of the constriction, and look upon the operation as a last resource; and they will not consent to its use until death is imminent. The operation itself is not a dangerous one; the condition that demands it is exceedingly so. Its performance, indeed, is harmless compared to the danger incurred by allowing the constriction to continue. Many have to deplore its performance too late; no one regrets resorting to it too soon.

Fourth, Radical Treatment.—When the milder measures have failed and reasons of necessity or expediency demand further interference, resort to the so-called "radical cure" may be entertained. Unfortunately there is too great a tendency nowadays to resort to cutting under any and all circumstances, but it is well to remind enthusiastic advocates of promiscuous operating that the "radical cure" operation is always a serious one and jeopardizes the patient's life, while the results obtained are not always commensurate with the risks incurred. Under the most favorable circumstances the mortality ranges from 2 per cent. to 5 per cent., and there is no reasonable assurance of a successful result. It should never, therefore, be lightly resorted to nor its acceptance urged upon the patient without proper cause.

Of the numerous methods employed, not one commands the respect of any considerable body of the profession. This is mainly due to the fact that no two agree on the essential objects to be accomplished and the best methods of securing them, as well as to

the unsatisfactory results obtained. A careful study of the different steps in the formation of an inguinal hernia will indicate the only method by which the injury can be repaired. The first step is the bulging or giving way of the parietal peritoneum, the sac of the hernia. Unless checked this gradually insinuates itself into the opening in the transversalis fascia forming the internal ring, causing a gaping or pouting of the lower lip. The hernial tumor then forces its way through the canal displacing the tissues of which it is composed, particularly the outer wall of the canal, and finally appears at the external ring.

The indications to be met to insure success are: first, the restoration of the peritoneum to its normal condition as near as possible, so as to permit of the free gliding movement of the bowels over the surface. To accomplish this the sac should be freed from all adhesions, the peritoneum loosened for some distance around the internal ring and gently pulled down, and the whole length of the sac should then be cut away, not only to obliterate the depression of its surface, but to remove every portion of the peritoneum which has become more or less altered from stretching. For the same reason the cut surfaces should be sutured together so as to present as smooth a surface as possible. When tied in a ligature there is more or less puckering which resists the free movements of the bowels over its surface; second, the pouting of the lower lip of the internal ring should be obliterated so as no longer to invite intrusion of the bowel, while the displaced external wall of the canal should be approximated to the inner wall, the better to support the peritoneum and transversalis fascia. This can be accomplished by passing two sutures parallel with the outer line of the canal as in the Macewen operation, the upper one including the lower edge of the internal ring. In large herniæ where the whole external wall is displaced, it would be well to insert two sutures in the same way along the inner line of the canal. In large old herniæ, where the internal ring is much dilated so as to be opposite the external ring, it will be necessary to freshen the hardened edges of the ring and suture them together with a continuous double suture. Every step of the operation should be done under the strictest antisepsis; all dead pockets should be avoided as they serve only to collect blood and serum; drainage tubes should not be used, if possible, and every effort should be made to secure healing by first intention, as it materially increases the prospects of success.

To be effectual and permanent, therefore, the operation must produce obliteration of the hernial sac, closure of its ventral orifice and strengthening of those weak parts in the abdominal parietes through which the rupture protrudes. At the same time, measures must be taken to produce an improved tone of the general system, particularly of the peritoneal ligaments of the viscera, by which the power they exert in retaining the organs in their normal position is restored. The more this is accomplished, and the closer the processes of nature are imitated, the more perfect the result; but no operation can be considered a "radical cure" that does not enable the sufferer to dispense with the use of a truss.

Hospital Closed.—The Binghampton (N.Y.) City Hospital has been closed, the Common Council having refused to vote the money for its support.

STRANGULATED HERNIA.

Read at the Meeting of the Inter-County Medical Society, held at West Superior, Wis., July 11, 1893.

BY WILLIAM E. GROUND, M.D.

SUPERIOR, WIS.

I would like to consider with you to-day the subject of strangulated hernia. Probably the two most important surgical subjects before the profession just now are appendicitis and hernia. Every cemetery contains the graves of patients who have unnecessarily died from these affections.

The frequency of hernia varies somewhat at the different periods of life. It is met with very frequently during infancy. During early life it is generally of the congenital inguinal variety and is more common on the right than on the left side, probably owing to the fact that the root of the mesentery occupies a lower position on the right side. The greater proportionate length of the mesentery in infancy greatly favors the occurrence of hernial protrusions of the intestines during that period of life. Mr. Lockwood has shown that the mesentery in the infant measures one-fifth the length of the body, at puberty one-eighth and in adult life one-ninth. After early life the frequency of hernia diminishes rapidly, until after puberty. From puberty the number grows larger as age advances until at the age of sixty, it has been said that one in four or five are ruptured. Taking the human race as a whole, it has been estimated by surgeons of large experience that from one-sixteenth to one-eighth are afflicted with this complaint. While it is generally admitted that hernia occurs most frequently in the laboring classes, there are many conditions in those of more sedentary habits which must necessarily favor the escape of the various abdominal viscera.

Among the factors operating and in a general way favoring hernia may be mentioned heredity. Not that there is any direct transmission but rather the conditions that predispose to it, viz., the weakness of abdominal wall, openness of the rings, long mesentery. The stretching of the abdominal walls by pregnancies render lax the pelvic peritoneum during the child bearing period, and thus greatly favors the occurrence of femoral hernia at that time of life. The increase of volume and weight of the omentum by the deposit of fat favor the occurrence of hernia. Weakening and debilitating diseases cause the tissues to become relaxed and in that way encourage hernia.

Certain necessary anatomical conditions or defects in the abdominal wall renders hernia possible. They may be natural weaknesses or exaggerations of the natural, if I may be allowed the use of so far-fetched an expression, or the retentive powers of the abdominal walls may be diminished by traumatisms, either intentional or accidental. Men have larger inguinal rings; women have a larger femoral arch, and one less filled in by muscles and less strong fascia.

Conditions being favorable certain immediate influences may result in the production of a hernia. These are lifting, coughing, crying, and straining to expel urine or feces.

A hernia is generally enclosed in a sac consisting of a protruded portion of the peritoneum. The peritoneal protrusion may have been pushed gradually through one of the openings as in the acquired inguinal form, or the process carried down by the

descent of the testicle may remain patent, so that the tunica vaginalis may form the sac in the congenital variety.

Femoral hernia is never congenital.

In inguinal hernia the parts that immediately concern us are the external and internal abdominal rings, and the inguinal canal. Still, it must be remembered at the outset that the rings and canal are only potential—they do not exist as rings or canal save when opened by a protrusion of the abdominal viscera or made so by a scalpel.

The separation or gap in the aponeurosis of the external oblique, called the external ring, allows the exit of the testicle and the spermatic cord in the male, and the round ligament of the uterus in the female. The size of the opening and the development and strength of its pillars and the fascia covering it vary greatly.

The internal ring is merely a funnel shaped expansion of the transverse fascia which the cord carries on with it as it escapes from the abdomen.

The flat sided passage in the abdominal wall between the external and internal rings is the inguinal canal. In very early life there is no canal, one ring lying directly behind the others to facilitate the passage of the testis. In the adult it measures about one inch and a half in length. The increased obliquity gives additional security.

A fullness or swelling out at one of the weak spots of the abdominal wall, which is more evident on standing, and which is especially noticeable when coughing or lifting, with the thighs flexed, is characteristic of the first appearance of hernia. It is a smooth uniform swelling which usually disappears when lying down to again reappear on standing. When the patient coughs or strains the tumor becomes tense, rises under the hand and expands in size. This manifestation is called the impulse and is generally characteristic of non-strangulated hernia.

Every organ in the abdomen has been known to have been herniated except the pancreas. The most common contents, however, of a hernial sac is some part of the intestine, usually the small bowel, or the omentum, or both.

A hernia may be reducible or irreducible. It may become incarcerated, inflamed or strangulated.

A hernia is said to be strangulated when the herniated portion of the bowel or omentum is so tightly constricted as to cut off completely the circulation. The whole circumference of the knuckle of bowel may be involved, or only one side of the loop, so that the channel is not completely closed, or only part of the circumference of the bowel protrudes and becomes strangulated, as in Richter's hernia. In this case only a portion of the intestinal canal is involved, and the bowels often continue to act during the period of strangulation. The vermiform appendix occasionally becomes herniated, either by itself or with the bowel or omentum. I, myself, have seen two such occurring in the practice of others. Brieger (*Archiv. für klin. Chir.*, Bd. 45, Hft. 4) reports twenty-two cases collected from different sources.

Whatever the contents of a hernial sac may be, the symptoms of strangulation are very much the same, though perhaps they differ much in degree.

The onset of strangulation is usually sudden, occurring generally while lifting or straining at stool, or doing some other exertion, especially when the thighs are flexed and adducted. Strangulation, however, may be gradual. But whether rapid or slow the effect is the same; the only difference is the length of time and the amount of constriction. The symptoms are generally so clear and well marked that a mistake in diagnosticating the condition is hardly possible; but occasionally cases are met with that are very puzzling. Because it is the most recent and standard work of surgery I quote from the American Text-Book on Surgery, page 778, the following diagnostic signs: "The symptoms of strangulated intestine are always the same, whether the strangulation occurs in the abdomen or outside of it, viz., faintness, collapse, severe abdominal pain chiefly referred to the umbilical region, complete constipation, so that flatus ceases to pass, then vomiting first of the food, then of bile-stained fluid, and finally of fluid with a fecal odor. The tongue is dry and brown and the pulse rapid. In strangulated hernia there are in addition, at first pain at the seat of rupture, a greater degree of tension, the tumor having increased in size, dullness on percussion over the hernia, and absence of impulse on coughing, with the fact that the tumor is irreducible. If unrelieved the abdomen becomes much distended, retching is more frequent and thirst intense, hiccough sets in, the urine is much diminished in quantity and the patient gradually sinks from exhaustion in eight or nine days, though in very acute cases he may die in forty-eight hours. The bowel by this time has become gangrenous or there is a general peritonitis. With the onset of the gangrene there is often a cessation of the more urgent symptoms as vomiting and pain. Often the symptoms are not so severe as just described, especially in femoral hernia. In recent herniae the symptoms are more acute than in old herniæ and they are not so urgent when omentum is protruded with the bowel, or when the tumor has for some time been irreducible."

I thus quote at length because there are some important features to which I desire to call special attention. There are perhaps few surgical emergencies calling for more prompt and judicious action than strangulated hernia; and the question as to whether we shall operate at once or delay and palliate, is of supreme importance to the life of the patient. A few moments of hesitancy and doubt on the part of the surgeon, and the patient may be lost. So, gentlemen, if I appear a little tedious on this particular point I hope you will pardon me, for I can assure you I have felt keenly my responsibility as I have been brought to face these conditions.

The degree of collapse varies with the acuteness of the obstruction and the portion of the bowel obstructed. Thus, Mr. Treves states that the jejeunum with its richer blood and nerve supply would resent an injury more energetically than the lower parts of the intestines, where there is less functional activity. The collapse and vomiting are due largely to the impression made on the great abdominal nerve plexuses by the pinching of the nerve filaments in the gut.

Vomiting may come on early or late in the progress of the case. When it does occur it rarely ceases until the strangulation is relieved or the patient dies. At first the vomited matter consists of undigested food, then of bile and later there comes up great gushes of a dark brown muddy liquid of an intensely offensive fecal odor. No matter whether

the vomiting appears early or late it is a symptom of grave omen. In a case of hernia in which any change has taken place in the condition of the tumor; such for example as an increase in size or tension with pain, and absence of expansile impulse, should be regarded as strangulated and treated as such. Do not wait for vomiting and other signs of intestinal obstruction. Vomiting is not a necessary condition of strangulation in the early stages and may not appear until gangrene is well established and septic peritonitis is present, and the powers of the patient so reduced as to often forbid a hope of recovery.

Pain may be very severe or it may be scarcely noticed. It may be at the seat of rupture and there may be wandering colicky pains all over the abdomen, but in nearly all cases there is a fixed dragging pain referred to the umbilicus.

Constipation is almost always present and is due, not necessarily to intestinal obstructions, but to the paralyzing effects on the visceral nerve supply. For we may have absolute constipation, and in fact generally do have constipation, where the herniated part consists only of omentum, or the appendix, or where the herniated part of the circumference of the bowel is included in the constriction and the canal is not obliterated, as in Richter's hernia, offering no mechanical impediment to the passage of fecal contents and gas; and further, we may have all the essential symptoms of strangulated hernia, such as vomiting, pain, constipation and collapse; but upon operating the sac is found to contain neither bowel nor omentum, only a little fluid, with no communication with the abdominal cavity; the operation, however, completely relieves the symptoms. While obstinate constipation is the rule, still Treves found three cases in fifty-three in which there was diarrhœa, and several that responded to laxatives.

The local symptoms are generally quite prominent. If the hernia is old and large and has been down many times, the size is likely increased and it may be fairly soft. Small strangulated herniæ are hard and tense, or if they contain omentum they feel doughy. Although the hernial tumor contains bowel, there may be dullness on percussion, owing to the small amount of air in the loop of the bowel, the thick walls, and to the fluid in the sac.

The impulse on coughing or straining is an important local feature and is of great diagnostic value; so much so indeed, that experienced surgeons have successfully calculated the nature of the contents of a hernial tumor by a careful estimation of the amount of expansion in the impulse. The impulse is principally due to the additional quantity of intestinal contents which is driven into the knuckle of gut by the act of coughing or straining. Of course it is very apparent that the amount and character of the impulse must be *markedly* influenced by the contents of the hernia. Thus in omental hernia, the expansion being due to the increased tension of the sac and to the sudden turgescence of the omental vessels, the impulse would naturally be relatively less in omental than in intestinal hernia. When strangulation occurs the contents of the sac are shut off from the abdomen and nothing more can enter; when the patient is made to cough the impulse is absent; provided, however, the constriction is situated as high at least as the internal abdominal ring. If the point of strangulation is below this all of that part of the hernia above will contribute toward an impulse. And it sometimes happens that all of the symptoms of strangulation are caused by a small knuckle of bowel being nipped at the extreme lower end of a long sac, thus leaving an excess of unstrangulated bowel. It is not uncommon to find in inguinal herniæ, long sacs extending down into the scrotum, divided into two or three compartments by two or more constricting bands or diaphragms. There is often a condition of free mobility in a strangulated hernia during coughing, especially if it be omental. The movements are, however, more of the nature of abrupt jumps and jerks in an up and down direction rather than expansile in character; that is to say, the tumor when the patient coughs not only rises under the hand but expands in size and is more marked in that part of the tumor lying near the ring. Again, when the strangulation is limited to the neck of the sac, although at the abdominal ring, the impulse may be present, provided, of course, the ring is not also concerned in the constriction. In very old and indurated masses of omentum, which completely fill the sac and block the external ring, even though it be not strangulated the expansile impulse may be absent.

As soon as possible after the diagnosis of strangulation is made it must be relieved, or the patient will surely die. Every moment increases the liability of gangrene in the bowel. The temporizing methods such as the application of heat and cold are applicable in only a very limited number of cases, and in fact they are generally used as aids to taxis. Applications of ice should be made only when the descent is recent, and even then not prolonged. In old persons with weak circulation, and in cases where the strangulation has existed for some time, the application of ice greatly favors gangrene. The application of heat can only be of value when an element of spasm exists and there is an irresistible desire to strain, as sometimes happens in large inguinal hernia.

Our means of reducing the strangulation is by taxis or herniotomy. Taxis is better adapted to inguinal than to femoral hernia, and to acquired than to congenital.

The patient should be etherized, and placed upon his back with his hips elevated and the thighs adducted and flexed upon the abdomen. The lower or external pillar of the ring blends with Poupart's ligament, to which is attached the fascia lata of the thigh, so that the position of the thigh affects the ring much. Thus extension and adduction of the thigh stretches the pillars and closes the ring, whereas flexion and adduction relaxes the pillars and opens the ring, relieves constriction and favors the return of the herniated viscera. Everything being ready the hands are thoroughly warmed, and while one hand firmly supports the neck of the hernia the other grasps the tumor and gently squeezes it, at the same time kneading it with a view of reducing its bulk. In manipulating the hernia great care must be used in making the pressure so that the whole surface of the finger pads and fingers are applied evenly, and the movements executed in a gentle, firm and regular manner. Avoid all forcible, unsteady and spasmodic manipulations; and above all avoid punching the finger tips into the parts, as they are admirably adapted for causing an unnecessary amount of bruising and possibly laceration of the gut. In inguinal hernia a slight downward pull is

usually made to straighten it out and the pressure is directed upward and outward. In femoral hernia the pressure is made at first downward to bring it opposite the saphenous opening, and then backward and upward. Generally the gut slips in with a sudden gurgle which is quite characteristic, or if the omentum, there is a gradual change and a sensation of emptiness of the sac. In either case there is immediate relief of the symptoms. I mean, of course, provided the strangulation is relieved. But it sometimes happens that the sac is separated from its surroundings and pushed bodily into the abdomen, with the contents still unreduced. This is termed reduction *en bloc*, in which case, although the tumor has disappeared the symptoms still persist. A trial of only a few moments is permissible during which manipulation may with safety be persisted in, in cases of apparent strangulation, no matter how gently it is applied. Even where a hernia is not strangulated prolonged manipulation may easily bring it about.

When properly applied taxis may be resorted to with propriety (*a*) in all cases seen very early, and the tension is not extreme; (*b*) in hernial tumors dull on percussion, with omental or fluid contents, if the impulse is present: (*c*) in cases where the symptoms are not urgent and where there has been no previous attempt made at reduction, and where the impulse is present. Taxis is more liable to succeed in inguinal than in femoral hernia, as the constricting tissues in the one are principally muscular, and in the other mainly ligamentous.

There are conditions in which taxis should not be resorted to at all in order to avert disaster. Here we have a loop of bowel distended with gas; rigid with vascular engorgement, constricted by a ring sometimes almost as sharp as a knife and over which the intestine acutely bulges in all directions, its vitality greatly impaired no fresh blood having entered it for hours; and under these circumstances and while in this condition an attempt is made to force it through the constriction. Can you imagine anything more unsurgical than this? Under these circumstances the bowel can be bruised or lacerated with the greatest ease. In fact, unless extreme gentleness and care are used some bruising will occur in the most favorable cases. In far advanced cases laceration may occur at the seat of stricture. Owing to the pressure exerted by the constricting band the bowel may already be partially eaten through by ulceration from within, or possibly it may be gangrenous at that point. Then very little force would be needed to complete the perforation. In other casess when the constricted part is not weakened by pathological changes instances are reported in which the gut was ruptured during taxis. In these cases the rent was not at the point of constriction, but on the distended portion of the bowel where the bulging was most prominent. In old irreducible hernia thee sometimes exist adhesions between the bowel and sac. If the adhesions themselves give way no harm follows; but they may be so strong and unyielding as to tear away some of the intestinal peritoneum in which event a partial laceration of the gut results, and is a serious accident if at all extensive. Another accident of taxis to which I have already referred, is the reduction *en massé* of the sac together with its contents, the strangulation being unreduced. This has happened on slight manipulation, and most often occurs in recent herniæ, in which the sac is not adherent. Rupture of the sac may occur, the bowel protruding through the rent into the submucous tissue.

Even after the hernia has been reduced by taxis serious results may follow. If the intestine is inflamed at the time of the reduction; or, if owing to its long strangulation its vitality becomes so lowered as to allow its walls to be invaded by infective irritants, sloughing, perforation and peritonitis follows. A patient whose nutrition is bad may do well for three or four days, when, suddenly a small gangrenous patch separates and the patient sinks into a state of collapse and dies from shock.

Should taxis fail to return the hernia unstrangulated to the abdominal cavity we must proceed at once to the performance of herniotomy. I would earnestly recommend that arrangements be made before the patient is etherized to proceed without delay to the operation should taxis fail.

I will now report two cases upon which I have operated recently.

Case 1.—O. G., age 28, laborer. Has been ruptured for ten years. The tumor was not large and could always be easily reduced. Never wore a truss. About the middle of the forenoon of March 11, 1893, while lifting a piece of timber in a stooping posture, he suddenly felt something give way in his left side and he sank to the ground. Dr. Baird was called and found a large, painful, irreducible hernial tumor in the left groin extending into the scrotum. He was at once removed to St. Francis hospital where I saw him with Dr. Baird. The patient was vomiting persistently, and the pain was severe. The man, large and robust, was now pale, pinched and anxious looking, pulse rapid and he was in a cold clammy sweat. Collapse seemed imminent, so little time was used in trying to reduce by manipulation, but preparation for operation was at once begun. The patient was etherized, the abdomen was shaved and all the usual antiseptic precautions taken. I was ably assisted by Drs. Baird, Spencer and King. An incision some six inches in length was made directly over the tumor, and the sac exposed and opened. The sac contained considerable dark colored fluid and about two feet of the large bowel, including the sigmoid flexure. The strangulated loop was dark and rigid with congestion. The constricting band which was at the internal ring was cut slightly and an attempt made to return the bowel, trying first at one end of the loop and then at the other, but it could not be returned. I then enlarged the ring to the extent of perhaps half an inch, before I could get the gut back into the abdominal cavity. Although the strangulation had existed for only about four hours its vitality was greatly impaired especially at one point where the constriction was firm, so that I hesitated somewhat about returning it. I did return it, however, and no bad results followed. I then dissected the sac free from the cord and other tissues and cut it off flush with the internal ring, after ligating it in sections with silkworm gut. The pillars were then sewn together with the same material, and I concluded the operation by doing McBurney's operation for radical cure. His bowels moved spontaneously on the second day and he made a prompt recovery. He is now at work in the woods and wears no truss.

Case 2.—I was called April 15, 1893, to see J. McG., age 27. He has had hernia several years. Was operated upon two years ago for strangulated hernia at which time the wound suppurated and he was in the hospital four months. He had worn a truss constantly. On this occasion, however, being somewhat under the influence of liquor he took off his truss. Within an hour his hernia came down and became strangulated. I saw him in the course of an hour and he was vomiting and suffering intense pain. I sent him to the hospital and tried taxis without an anæsthetic. I finally prepared for an operation, and etherized the patient, applied taxis for a few moments but failed. I sterilized and made an incision three inches long directly over the tumor which was on the right groin. The tissues were so much matted together as to hardly be distinguished. After much careful dissection the sac was opened. This structure was much thickened and opaque. The sac contained a small knuckle of bowel and a large piece of omentum, which was much hypertro

phied, and adherent to the sac. After relieving the constriction at the ring, the bowel was returned quite readily but the omentum could not be reduced without much handling and bruising. I therefore ligated it off in small sections and cut off a piece as large as my hand, and returned the stump to the abdomen. I then did a McBurney operation for radical cure. The case did well. Had a spontaneous movement of the bowels on the third day. In about a week his temperature went up to 103 and on removing the dressing found a mural abscess in the lower pillar of the ring. This was opened and discharged pus, but closed in a few days and the case finally went on to recovery, the patient leaving the hospital in about six weeks.

There are a few interesting points suggested by these cases. Many surgeons advise to only slightly nick the constricting tissues; but it seems to me better surgery to make the incision free enough to allow the herniated part to be easily returned, than to make a slight cut so that the gut will have to be literally crowded back. For the bowel may be in such a critical condition that even slight handling may greatly lessen the patient's chances for recovery, or even precipitate a fatal result. Then, I think, the omentum is liable to complicate matters very much. If much injured it is liable to inflame and if infected set up a septic peritonitis. It may form adhesions near the ring and guide the bowel to that point, thus greatly favoring a return of the hernia. If it is much hypertrophied and does not return readily it had better be removed and in doing this considerable care is necessary. The omentum should never be tied off in one mass nor even in large sections owing to the liability to hemorrhage? A ligature may sufficiently constrict the tissues as to prevent bleeding at the time but the fat is soon absorbed from under the ligature and it gets loose and allows free hemorrhage. So it is necessary to ligate in small sections and be sure the bleeding is thoroughly stopped before returning to the abdomen. In neither of these cases could an impulse be made out and this influenced me very materially in promptly resorting to herniotomy. In fact, many surgeons contend that when the impulse is absent an attempt should not be made to reduce by manipulation if there exists any other symptoms of strangulation.

REPORT OF CASES IN EVIDENCE OF ADVANCED THEORY OF SURGICAL IMPUNITY OF THE PERITONEAL VISCERA.

Read in the Section on Surgery and Anatomy, at the Forty-fourth Annual Meeting of the American Medical Association.

BY JOHN E. LINK, M.D.
TERRE HAUTE, IND.

To the members of this Association I feel that I should make some explanation, if not apology, in presenting this work.

I am possibly somewhat differently situated from the most of the prominent workers of the Surgical Section, and therefore from the environment of my location am able to draw some conclusions at variance with the experience of the city and hospital surgeon and teacher.

There are, we may all know, two classes of surgeons radically different in their methods of doing good, the conservative and the bold or daring. And whilst I may have in some remarks before the Section as well as in printed articles seemed to imply that with regard to abdominal work I place myself with the latter, surely I do not wish to so stand. I am decidedly in favor of conservative means in all cases where delay is not hazardous, and surely I agree with Dr. Senn, when he says these cases of abdominal surgery are sometimes attended by the greatest of difficulty; and I emphasize this sentiment, and say none should venture but those thoroughly equipped with the essentials of knack, love of the good to be done and a thorough training incident to clinical teachings and experience. The fad of recording experiences, and the love of dramatic display have too often, I am sorry to say, within my own circle of observation, characterized the laparotomist. Removal of the ovaries for imaginary disease incident to neurotic constitution has been done, to my positive conviction, either through ignorance or viciousness in desire to make display of skill, where, as I have tried to show, no anatomical knowledge nor special surgical skill was required.

Hoping that I will be excused for these preliminary remarks, I will only add with regard to the misunderstanding between myself and Dr. Senn at Detroit, that I regret it, both for the sake of the interest that I entertain for my profession and the hazarding of a personal friendship.

That I am an advocate of cleanly and careful painstaking detail in surgery, when not interfering with an important principle, should stand without the saying. That Dr. Senn has done a grand work in this particular line is established, and I only wish to add my mite to the mountain rather than in any particular to tear it down.

What I expect or desire to accomplish in the experiments that I shall report, is to show that instead of the fine details of cleanliness, catgut, silkworm gut, kangaroo tendon ligature, Lembert stitch and all that, being an essential feature of success, there is a tolerance of tissue here that not only invites the skill of the surgeon but demands the surgical attention of the doctor, when traumatized; and that any and all lines of progress however desirable in improved technic are of far less importance than that of promptness in this emergency work, not only in cases of penetrating wounds which I hold stand first, but in many others: appendicitis not being less than second in importance, whether, with perforation and general diffusion throughout the peritoneal cavity, or threatening. I believe that all cases of uncomplicated perforation of the bowel, barring accident, can be saved.

I am not here to present complications in idiopathic nor traumatic cases. I leave that to Dr. Senn and his *confrères*. I am only here to prove peritoneal tolerance to *outside entrance*—that there are no organized enemies lurking in the normal atmosphere. They are only, or in the most part, in old hospital wards and we country doctors have only to keep our patients away from them, and "aseptic surgery" so-called need not distract a moment of our time and attention, so greatly needed in these penetrating wounds, appendicitis, intussusseption and obstruction of the lumen of the alimentary canal.

Antiseptic surgery got the credit at one time of making abdominal surgery practically safe. We are all, I think, now aware of the fact that the means so employed hazarded the life of the patient; but it has left a nucleus of thought in riddance of a pathological fallacy and popular superstition; and stands to abdominal surgery at least in about the same

light, in virtue, that Hahnemannism does to scientific medicine.

My operations were all made in an old uncleaned barn or stable, several of them on the floor littered with decaying animal and vegetable matter; the others on an improvised table constructed of old boards picked up from the floor. Dogs unwashed and hands soiled—no water, soap or other disinfectant was used in any sense. Patient usually confined successively in a close kennel three by four feet with open or slat floor about a foot from the ground; kennels never washed or disinfected.

They were all so treated with the exception of two left in a bin in barn on account of cold weather. These both escaped, with bad results as reported, by jumping over a tight board partition about five feet high.

The number of cases is limited owing to the place of operation having to be torn down to give right of way for a railroad sidetrack, and just at a time when I was in the midst of my work. I was forced to discontinue during the cold weather of winter, owing to the above cause, and I was also unable to make any operations between April 28 and May 28.

I try to show nature's process of repair as well as tolerancy of tissue, and therefore have preserved the lives of some of the dogs for considerable length of time. In two instances I have made a second operation on the same dog at a considerable interval of time between.

Case 1.—Dog No. 1. Laparotomy on female dog, weight thirty-four pounds, May 31, 1892. Cut the ileum three-fourths across; sewed with darning needle armed with lapping yarn two ply; three interrupted sutures. Cut again within an inch and a half of the first incision. This cut Dr. L. J. Willien of Terre Haute, closed with aseptic catgut suture, interrupted Lembert stitch; cut again at about three inches from the latter, and closed with braided surgeon's silk in a large armed needle, taking three stitches, interrupted, and reënforced between each with black cotton, ordinary sewing thread and small cambric needle. Closed the abdominal walls with three deep stitches, including skin muscles and peritoneal coat in each stitch, using black braided surgeon's silk and large curved needle.

I placed the bitch in close confinement; gave water only, for two days; then milk until the fifth day, when I gave her well-cooked beefsteak, which she took with relish; killed her the fifth day of June. Post-mortem revealed no peritonitis whatever. The two wounds which were closed with coarse sutures were patched with omentum; the one with surgeon's silk I exposed by tearing away the omental patch and found sutures still in place, but loosening by slough in the direction of the mucous membrane. The wound closed with catgut Lembert stitch had healed by first intention; specimen preserved and presented before the Surgical Section American Medical Association at Detroit.

Case 2.—Dog No. 2. Weight of dog twelve pounds; female. Operation done August 23, 1892. Opened the cavity and with fore-finger caught up and drew out a loop of the ileum covered with omentum; cut through omental covering and incised the bowel transversely to about two-thirds its circumference; sewed with sutures of lapping yarn in darning needle as in Case 1. Confined the dog, and gave only water for three days, then milk until the sixth day when I fed stewed chicken. By mistake the dog got the end of a chicken bone and gulped it without crushing. From this time on I fed meat freely. The dog evinced no suffering.

I presented this case to the Vigo County Medical Society, Thursday Sept. 12, 1892, the tenth day after operation. The abdominal wound was perfectly closed, apparently by first intention. I had removed the sutures on the fifth day. There was little or no evidence of suppuration. The dog was chloroformed and the abdomen re-opened.

There was no evidence of general peritonitis. On close examination a convulvulus of the ileum was found and the bowel adherent to the mesentery which in this case seems to have formed the medium of covering in healing. Dog killed and specimen marked No. 2 preserved with a specimen of stitches as used, made post-mortem. Later, the end of thigh bone of chicken is found lodged at cicatricial convulvulus, where it remains to be seen, somewhat impacted, but no impaction of bowel contents above.

Case 3.—Dog No. 3. Black dog, male; weight, thirty-five pounds, operation done October 11, assisted by Dr. B. A. Watson of Jersey City, N. J., author of "Amputations and Complications," dedicated to Lister, also author of "Pyemia and Septicemia," Pepper's Practice, etc.

With hands black from handling dog fresh from dirty kennel, all unwashed, I made an incision of about two inches in length. Drew out the omentum in considerable quantity until I exposed the ileum which I caught up and withdrew until several inches was exposed. I cut well across to the mesenteric attachment, and then sewed with darning needle armed with three ply cotton wrapping cord making three interrupted sutures, tied in heavy knot and cut at about an eighth of an inch in length. Bowels and omentum were replaced without cleansing and the parietal wound closed with three deep stitches, surgeon's silk. Dog confined in same kennel as the other two, was very impatient of restraint, yelping most constantly day and night. Was watered and fed as the others. On the seventh day placed him in the barn with other dogs.

Though the parietal wound was open and gaping, the opening was well closed at the bottom, the peritoneal coat having closed by adhesion. Dog's life preserved for other experimental purposes.

Case No. 4.—Dog No. 4. Weight of dog sixty pounds. Operation October 22, 1892, assisted by Dr. Shaley of Terre Haute and Dr. Brunker of Riley. A small opening was made in the median line; the omentum drawn out and a loop of ileum exposed and cut across; three interrupted sutures with darning needle and three ply cotton yarn was used.

This operation was attended by much embarrassment in stitching up the parietal wound, returning the viscera, etc., owing to imperfect etherization; and the fact that the operation was done on the barn floor littered with chaff, straw and general debris which was constantly getting mixed up with the bowels and omentum. The dog had been *fed* freely a short time before and vomited copiously confined to a chain on barn floor. By October 27th, the dog was apparently well, wound nearly healed. Dog preserved until March 1st, when in an effort to etherize, he died.

Specimen preserved and labeled No. 4. The specimen shows the alimentary tract perfectly normal, and only a thread of omentum left clinging to the point of injury, absorption evidently having cleared up the scaffolding of support—nature's workmanship displayed.

Case 5.—Operation same as No. 4. Operation done Oct. 22, 1892. Oct. 23d dog running at large in stable, having escaped over five foot board partition; 25th, dog quite out of sorts, external wound gaping; 26th, more cheerful, on his feet but I feed nothing; 27th, seems much improved and eats some soft, well cooked meat; swallowed a short piece of bone—mutton rib—two or three inches long; confined again but escaped during the night by jumping and is found dead in the stable the next morning. Post-mortem examination reveals a large clot of blood, at least eight ounces; no fecal extravasation or bowel perforation. There is a large mass of omentum and bowel agglutinate with lumph, no general peritonitis. Dog evidently died from hemorrhage and shock, incident to injury received in escaping from confinement. Specimen preserved and marked No. 5.

Case 6.—Operation done Oct. 22, 1893, same as Nos. 4 and 5; small black dog; weight six pounds. Oct. 23d, dog escaped from confinement and is nowhere to be found; Oct. 27th, dog found under barn floor, omentum protruding in a mass as large as a hulled walnut; 28th, dog is in good condition as above; fed some well cooked meat; put a ligature around the tumor with intention of strangulating and removing. Nov. 11th tumor still there and somewhat enlarged. With

the assistance of Dr. Glover of Terre Haute, I etherize and cut around the tumor, through into the peritoneal cavity and remove leaving a large gaping wound. We decided to kill the dog and make post-mortem examination of the bowel wound. There is a slight adhesion of the bowel—ileum—to the parietal walls in the lumbar region, left side. In order to preserve it as we find it the musele is in part removed with the viscus. The cut in the bowel seems to have been patched by adhesions to the mesentery. The bowel is cut first across near where the injury appears, and then slit longitudinally so as to expose the inner surface of the bowel. The sutures are found still clinging by the merest hold to the mucous membrane covered with a mass of calcareous concretion; the inner membrane of the bowel is rough and slightly thickened; lumen of the bowel apparently increased from relapsed condition of coats of bowel, which are well reënforced by patch on the peritoneal aspect. See specimen No. 6.

Case 7.—Female dog. Dies under the influence of the anæsthetic commercial ether.

Case 8.—Small dog. Operation done April 11, 1893, under anæsthesia, Squibbs ether. An incision about two inches long was made below the umbilicus; the omentum pulled out and a loop of the bowel secured and cut entirely across; incision made with scissors, the cut extending into the mesentery. I sewed up the wound with cambric needle armed with flax thread; continued suture beginning at mesenteric line extending around until I reach the point of commencing when I tie the two ends of the thread, exercising some care not to draw too tightly—the danger being that the sutures thus applied if drawn upon will act as a drawstring puckering and thus contracting the lumen of the bowel. The bowel and omentum are now returned and the parietal wound is closed with curved surgeon's needle armed with flax thread, two deep interrupted sutures being used. Dog confined and treated as the others before described, until the eighth day when he is fed cooked meat and given his liberty in the barn with other dogs. April 19th, dog killed and post-mortem examination made; find a large mass formed of lymph and mesentery about one and a half inches in diameter to which the mesenteric aspect of the wounded bowel is adherent. The outer side of the wounded bowel is patched with adherent omentum. There is no diffused or general peritonitis. The viscera are all in healthy condition notwithstanding as I should have before stated the dog had fallen the night before through a hole in the floor of the loft to the stable floor below, a distance of nine feet. There is an acute curve of the bowel as it is found imbedded in the above described tumor. The lumen is normal—no stenosis nor dilation perceptible. Made no effort to examine condition of sutures. The parietal structures are preserved so as to show the bad condition of outer wound and the perfect healing of the peritoneal aspect with mesentery attached. Specimen preserved marked No. 8.

Case 9.—Small dog, male; operation done April 3, 1893, assisted by Dr. Mason of Terre Haute; anæsthetized with commercial ether; opened abdomen with rusty scalpel; caught up a loop of small intestines; cut out a segment about two and a half inches in length; tied the whole of intervening mesentery with a fillet of silk thread carried around with a curved surgeon's needle; sewed the two, distal and proximal, ends of the cut bowel together, using darning needle with heavy lapping yarn; first stitch at the point of mesenteric attachment, the next at the opposite curvature and then once at midway between these on both sides, and for additional security against possible leakage I put an interrupted suture of small cotton thread with cambric needle between these. All sutures are interrupted. The intervening segment of bowel is now removed by cutting the mesentery at point between the fillet and intestinal line. Owing to some oozing of blood I, for additional security again place another ligature or fillet about the mesenteric fold, this time including about a half inch of that supplying each sewed end of the bowel. We must here depend upon voluntary transplantation of vascular tissue to replace the cut off mesenteric supply. The bowels and mesentery are now returned, with some attendant difficulty owing to small parietal opening; there is in consequence of the squiring process, some leakage of the contents of the bowel between the stitches. The parietal wound is closed by two deep interrupted silk sutures. Dog treated much as the others described. On the tenth day after operation the stitches were removed from parietal wound, which is closed; the dog has been eating heartily for two or three days; has a full healthy discharge from the bowels, normal in size and consistency, which I have preserved, dried for your inspection. Dog's life preserved for purpose of future experiments.

This is same dog as Case 11, operated upon and killed before the Surgical Section; post-mortem examination hurriedly made failed to reveal point of resection of bowel; later assisted by Dr. Marcy of Boston, we found the point of injury and repair; the lumen of the bowel was about normal in caliber and line; there was a thin veil or sheet of omental patch covering the section to the extent of about two inches in length; coats of the bowel nearly normal, excepting the outer, thickened by overlying patch of adherent omental tissue. Specimen along with the segment removed, preserved in bottle marked No. 9.

Case 10.—Dog No. 9.—Operation done May 28; cut small hole in ileum and sutured with cambric needle armed with double cotton thread; single suture; dog killed and post-mortem examination made June 6. There is some difficulty experienced in finding point of last cut as well as that of the first reported "case 10," but a careful examination later reveals the bowel covered with very thin sheet of omentum; the bowel is opened by longitudinal incision and the suture as described above is found adherent to the two inner coats of the bowel; mucous membrane slightly thickened for a length of two or more inches. Specimen preserved and marked No. 10.

Case 11.—Dog No 3.—Second laparotomy; first Oct. 11; reported "Case No. 3." Operation May 28, 1893; made short incision above old cicatrix; hooked out a loop of, and cut small hole in bowel; closed with one suture, coarse cord and darning needle; closed outer wound with flax thread in curved needle, single suture; killed dog June 4; post-mortem examination shows a small omental band attached to a point of ileum; evidently the patched wound of first operation; the coats of the bowel are thickened by overlying omental patch of about an inch in length; width of omental strip attached to bowel is about half an inch at point of juncture and four or five inches in length; the caliber of the gut at site of operation is a little enlarged.

There is also found a mass of omentum and mesentery agglutinated to the abdominal parietal at point of peritoneal cut, with the ileum firmly attached to this mass. I cut into the bowel longitudinally, and find the coarse suture like a ring lying loose in folds of the mucous coat; I attached it with a thread in order to maintain it where found. Specimen placed in glass bottle marked No. 11.

Case 12.—Small black and tan female. Operated May 29th; cut bowel half across; used the same thread for suture that I used in two cases previously, washing the dried blood clot from it in cold water; no disinfectant—not even soap—was used. Closed the wound in bowel with one lapping cord and two flax thread interrupted sutures. Closed the parietal opening with a double flax thread, single interrupted suture; killed the dog June 4th. Post-mortem examination shows outer wound closed with sutures adherent. Parietal surface closed, with mesentery attached; no congestive or inflammatory action perceptible. Gut wound agglutinated to omentum. On exposure by opening the lumen of the bowel there is a ragged condition of the edges of the gut wound revealed; the sutures have disappeared by sloughing. Specimen preserved, marked No. 12.

Case 13.—Young shepherd dog, half grown; anæsthetized with chloroform May 30, 1893; cut short opening in parietal walls; hooked out with dirty fingers a loop of ileum; cut small hole through omentum into the bowel; sewed latter with darning needle and cotton cord, same string as used in case 10 and 11, made pliable by simply wetting in cold water. Returned viscera and closed parietal wound with double flax thread single suture, deeply taken through skin and muscle with a lighter hold on peritoneal coat. Dog confined to a short chain on bed of shavings. Treated same as others and killed June 4th. Specimen preserved in salt to June 10th, then in alcohol and glycerine. There is less agglutination of viscera than in any of the other recent cases. The ileum makes a long loop of four inches from a sharp turn to point where the wound is situated and seals itself against the mesentery of the same bowel. On making longitudinal incision through the normal appearing bowel there is found a single suture of coarse cord, the same as described in closing the wound, attached by a slight hold on mucous membrane. The peritoneal line of parietal wound had healed by first intention; the other was gaping and in bad condition. Specimen of gut and parietal wounds preserved marked No. 13.

Case 14.—Fox hound; operation done May 31st. Bowel cut half across; three lapping yarn darning needle sutures

used in closing; bowel replaced and parietal wound closed with a single interrupted flax thread suture. Dog killed June 4th. Specimen shows a large mass of omental tissue covering the wound. I tear it away sufficiently to show the sutures still *in situ*, but slightly loosened from their original hold on the three coats of the bowel, peritoneal cutting through. Specimen marked No. 14.

Case 15.—Dog No 9.—Same individual as Case 9 and 10; June 6th, chloroformed the dog for third experimental operation, in order to show method of operating, before the surgical Section. Dog died under influence of anæsthetic before being brought forward; used dead body to show facility by which the abdomen can be opened without wounding viscera; rusty scalpel is shown; one cut reaches the cavity but opening is too small to admit of the hooking out of the intestines; scalpel is inserted with finger still in the cavity as a guide, when a somewhat *transfixing* cut is made and bowel withdrawn which is cut with scissors and sewed with darning needle and cord, as previously described. The specimen with others as above reported are presented for examination. The specimen with rough sample stitch is preserved with a considerable portion of the normal gut and mesentery; valuable as evidence of non-inflammatory action of peritoneal structures, from operative interference. Marked No. 19.

Dr. Manley of New York—It is unfortunate Dr. Link has so little time. This exhibit, of rough and ready character, is not without interest. Indeed, it is particularly interesting just now, when the heat of discussion has passed over in reference to the treatment of lesions of the peritoneum. The value of Dr. Link's paper seems to me to be in two directions: first, with reference to the fact that the peritoneal cavity, when opened under proper circumstances, is not attended with very great danger; second, with reference to antisepsis or asepsis. I remember very well at Washington, when Dr. Link was present at the International Congress, at the time the antiseptic doctrine was at full height and it was almost treason for one to question its efficacy, and he, like Tait, stood as he stands now. The doctor has shown, as far as the lower animal is concerned, it is immaterial whether we employ antisepsis or asepsis. But, a great many think those operations, which are so easily and readily performed on the dog are the same in the human being, whereas there is scarcely any analogy. We can remove a foot or so of intestine in the dog and the animal scarcely lose a meal, while in the human being we must have a profound regard for that structure. Dr. Link has shown us how lesions, simple in character, can be dealt with quite readily. I think he has accomplished a great deal of good. In the presence of a lesion of the intestine it is not necessary to lay our patient up until a specialist can arrive.

Dr. Connell, Wis.—I think it is now over a year ago that Dr. McKay of this city, concluded to do some work of this character. The superintendent of the poor farm furnished us material, and we got the spayist up there to help us. He, I am quite sure, had not washed his hands for a year. He opened the abdomen with his penknife, and stuck his hands in the cavity. Nevertheless, the animal recovered. Sometime ago I tried a series of experiments with the oblique stitch, and after performing some ten or twelve of these experiments antiseptically I concluded to make an anastomosis, using the same principle. I thought that while I was killing a dog upon which I had operated before, I would practice upon him and prepare myself for an oblique operation I was going to make in a few days. I placed the dog on the table, under the influence of ether, and since I was going to kill him I took no precautions to wash my hands, but tore open the mesentery with my fingers, pulled out the intestine, cut it and drew it together with a piece of hemp thread. After I got through the dog looked so well that I concluded to wait and see whether he would live. Six months afterward I killed him, and tomorrow I will show you the specimen. After I had worked a little while on the anastomosis I determined to unite the duodenum with the gall-bladder, thinking I would at the same time kill the dog. He lived and I killed him a few weeks afterward, and in that case there was no attempt made at antisepsis.

Dr. Geo. McRae, Ga.—It seems to me the discussion is rather unfortunate than fortunate for this Section. It does seem to me, that because we can get good results occasionally by bad surgery, we should never be warranted in doing bad surgery. It is not that we can obtain good results in spite of this surgery, but we should seek measures which will in the largest number of cases accomplish the best results. This kind of negative reasoning would tear down the foundations of medicine. We occasionally get good results by bad operations, but those cases are rather unfortunate for us in that they cause us to be careless in carrying out the methods which will give the best results.

Dr. H. O. Walker of Detroit—The dog experiments are to be regarded as a means to show how to do these operations, but when you attempt to perform the same operation in the human subject it is very different.

Dr. La Place of Philadelphia—In my mind Dr. Link's specimens only mean that the dog is a very good animal to experiment on. If there is any one subject that has brought surgery to the high position it now occupies, it is the knowledge of bacteriology; it is the knowledge that if you keep certain germs out of the soil, suppuration will be absent, which caused the death of nine-tenths of our surgical cases before the days of bacteriology. What do the experiments of Dr. Link lead to? They show simply that as the dog can eat rotten meat and dirt and live on it, so any one can admit dirt into the peritoneal cavity and live, but as we can not eat that food and live, so we can not have the least dirt in the peritoneal cavity and live. Man seems to be the soil best adapted to most germs; his serum is less resistant than that of the lower animals. This is proven by the experiments of the doctor. Therefore, I do not agree with the gentleman, that this would have a bad moral effect on the Section. I hope every one will realize the value of that communication. It does not imply that we should be less careful in the ideal cleanliness. Gentlemen, even at our own table we distinguish the man by the nicety of his cleanliness. Be absolutely cleanly, and then we will have eliminated all the risks. We want to have 100 per cent. of success, if possible, although that perhaps will never be achieved. Try at least to eliminate dirt.

Dr. Hoffman of Philadelphia—It has been my very good and bad fortune to see some very good and bad surgery. I have seen one case where the nurse washed out one of the sponges in a slop bucket, and the patient got well. In another case the operator asked the assistant to insert his finger into the rectum to hold up the tubes, and when the operator turned his back the assistant inserted his finger into the peritoneum, and the patient got well. Another case: The attendant brushed off the table and then, without washing his hands, operated, and the patient got well. However, I do not believe any of us would choose one of those operators to do our work. I do not believe the man who plays with sepsis, antisepsis and asepsis, interconvertibly would go to the man who believes them interconvertible for his surgery. I do not believe chemicals will make any surgery clean.

Dr. Link—I call the gentleman to order. I have said before, and said again to-day, there is no comparison between the peritoneum of the human and of the dog.

Chairman—He is simply showing the tolerance of the peritoneum, giving three cases to illustrate it.

Dr. Hoffman, continuing.—Mr. President and Gentlemen: I think those gentlemen who have left the term antisepsis and gone over to asepsis have done a great deal; I think they

have gone to show that sepsis depends on uncleanliness. We do not wish barrels and buckets of chemicals, but simply such measures are as necessary to make us clean. The man who has never done surgery and operates upon an animal by animal methods, will be mistaken if he goes into the operating room and expects the same results by the same methods. Animals are tolerant and intolerant, just as in some, large doses of medicine will produce no effect and in others will cause death. Now, without any disparagement to those gentlemen who try to show that surgery on the animal is the same as on man, except to show what has been done, I will say the man who trusts to animal experiments will carry his animal experiments and dirt along into human surgery, and just as sure as he does his results are sure to be bad. The tendency is to be careless, and carelessness means dirt. Just as soon as watchfulness is gone, just that soon dirt creeps in.

DR. MUDD, St. Louis—I think the paper presented by Dr. Link has its purpose. I think that perfect cleanliness, which comes with perfect surgery, is the purpose of all our work. It simply shows we have our individual ideals, and each man carries some imperfections. There is no universal ideal at which we will tend, but each of us have an ideal standard toward which he tends. You will find many inconsistencies in the work of to-day. I think this variety in results shown here to-day is good for us, because it gives us food for thought.

DR. J. B. ROBERTS, Philadelphia—One point has not been brought out here; that is, although it is admitted the peritoneal cavity or peritoneum is tolerant to many kinds of bacteria, it has been proven to us that we must not apply this reasoning or experiments to other operations in the human body. I think Dr. Link will say he would not apply this kind of surgery to other operations, as amputation of a dog's limb, for the peritoneum is tolerant to some things which cut muscles and other tissues will not stand. It seems to me Dr. Link has shown us a valuable thing in that the surgeon must do the best he can. Many surgeons, it seems to me, are ridiculous in the cumbersomeness of their methods. If we will only remember, what seems to me to be the essence and principle of modern surgery, that some tissue and some animals and some people, at some time and under some circumstances are in such conditions that they are resistant to bacteria while at other times they are not resistant; that sometimes these bacteria will do harm and sometimes they will not, it makes no difference whether you call it antiseptic or aseptic surgery, or clean surgery, or Jones' surgery or Smith's surgery.

DR. PRICE, Philadelphia—As to the tolerance of the peritoneum, it matters but little in all intraperitoneal operations what you remove if you do it well and cleanly, but it does matter what you let in. I do not hold, with an enormous experience in peritoneal surgery, that the tolerance is very great. I know a lymph sac is capable of digesting such material as blood, water, etc., so long as there is no dirt in it. There should be less talk about the tolerance of the peritoneum, and less of this experimenting on dumb brutes as well as on human beings. I am satisfied some of our best surgeons observe the best of care in the peritoneum of the dumb brute. It has been my bad fortune to have to do with a large number of post-operative sequelæ of bad surgery, and I usually find it due to irritating solutions and sluggish surgery. Only yesterday I released a uterus with the whole free extremity of the omentum about the cicatrix. I knew before the operation what I had to deal with, because I knew whose hand had been in there. I will close my discussion by saying, this law of cleanliness not only holds good in surgery but it is of paramount value in obstetrics and in everything that approximates surgery. Cleanliness is paramount. I know of nothing so absolutely important as cleanliness in medicine. I have had 1,300 labors without a death from any cause, and it is wholly due to cleanliness.

DR. J. MCFADDEN GASTON, Ga.—If we will but recollect what has been the recorded results of penetrating wounds of the abdomen, gunshot and knife, in regard to the results in view of operative measures compared with non-operative measures, it will throw some light on the inference to be drawn from this discussion.

DR. LINK—The bad condition of some of these wounds simply shows we must be clean to obtain the best results. Some of the gentlemen have gone from the subject here presented to bacteriological relations and the condemning of my dirty surgery. This I insist is entirely unjustifiable in the light of my opening disclaimer. Dr. Gaston speaks of penetrating wounds, and I would like to ask how many penetrating wounds of this kind have lived without operation. Cases of penetrating wounds, where the bowels are implicated, usually die if not operated upon at once. As I said in Detroit, if a case of this kind came into my hands I would not treat it if I could avoid doing so, for I admit and admitted then Dr. Senn is superior to myself in his technique, appliances, etc. I do believe in this beautiful toilet of surgery if obtainable, but we should not cover up a deep physiological principle with simple technique. I am now speaking to men more competent than I am and who are better teachers than I am, but I say to the general practitioner, if you find a penetrating wound of the intestines, it is your duty to close it up and in the meantime if your discretion suggest, send for the specialist; but do not allow the excretions and dirty contents of the bowel to get into the peritoneal cavity while waiting for the specialist to arrive, but operate at once. There is not one of us who claims to-day that antiseptics cure the patients. And, what do we learn from this? We learn that we do not have to use antiseptics. Just as Hahnemannism taught us that large doses do not always cure our patients, so this shows that cases may recover without antisepsis or asepsis.

UNNECESSARY RESTRICTIONS IN SURGERY.

Read in the Section of Surgery and Anatomy at the Forty-fourth Annual Meeting of the American Medical Association.

BY JOHN B. ROBERTS, A.M., M.D.
PHILADELPHIA.

While I fully appreciate the need for caution and care in all departments of medicine, I have of late years come to believe that patients are often subjected to restrictions which add to their discomfort, without bringing any commensurate advantage in shortening the time of recovery or guaranteeing the permanency of cure.

The inaccuracy of our former knowledge of the causes of surgical complications and a college teaching, which gives little opportunity for the exercise of individual judgment, have tended to make the timid or inexperienced practitioner follow with blind zeal the dogmatic assertions of writers and teachers of recognized authority.

It is true that it is better to err on the side of caution than to expose a patient to unwarranted risk in a desire to give him greater liberty. On the other hand, the establishment of a nervous dread in the mind of an invalid is one of the chief causes of the habitual semi-invalidism now so prevalent in many walks of life. Physicians are unwittingly the cause of many symptoms which torment neurasthenic humanity.

Surgical affections and operations are so associated with disability in the public mind, that it usually takes but a word to make the patient think himself debarred from the most innocuous liberty.

In order to hear the views of this representative body of working surgeons, I wish to cite a few instances, which seem to me evidences of unncessary restriction in surgical practice.

Is it not true that patients with fractures of the fibula and tibia are often kept in bed too long and even prevented from carrying on essential business enterprises, because the surgeon fails to recognize the utility of a plaster of Paris dressing? Are not persons with fractures of the bones of the forearm compelled to wear cumbersome splints longer than necessary, and thereby debarred from using the hand for personal needs and for writing?

Tuberculous spondylitis and coxitis are often the cause of many months' confinement in bed in a stuffy chamber; because the surgeon fails to realize that the sunshine and fresh air are urging him to apply a gypsum jacket or a hip splint and send the pallid little patient out into the fields which he himself daily enjoys. I advise no undue hurry in omitting the valuable rest which pertains to recumbency; but it is often maintained too long.

Again, it is not unusual for convalescents of all kinds to be kept in the house, when driving or even walking a short distance in the open air would stimulate appetite and induce sleep better than any tonic or soporific. Immobilization of joints and repaired fractures should not be too long continued. Absorption of inflammatory deposits and pliability of muscular masses are induced by voluntary use and massage. The value of these adjuvants to treatment is diminished by a delayed resort to them. Sprains and chronic joint affections, of certain kinds especially, call for motion and even painful manipulation.

The somewhat fashionable restriction of voluntary movements of the limbs after abdominal operations is, I am sure, usually unnecessary and in many cases adds to the accumulated discomforts attending all surgical procedures. There are, I believe, few operations that demand maintenance of the supine position for a long series of hours. Turning the patient carefully a little to the right or to the left does no harm, as a rule, and makes disease more tolerable.

To deny water to those who have recently been subjected to operation is often a refined cruelty, reminding one of the days when patients, parched with typhoid fever, were not allowed to have the tongue even moistened with cool water. Copious draughts of water may possibly do harm immediately after recovery from anæsthesia because they may induce vomiting. Soon, however, moderate quantities of water may be drunk with impunity and are of advantage in filling up the vessels depleted by any previous bleeding. Do not allow your patients to drink water inordinately, and restrict its use if real evidence is forthcoming of its harmfulness. Mere theory, however, must not be permitted to stand against the well known value of water as an agent which keeps skin, kidneys and bowels active, reduces temperature, and plays a physiological role in reëstablishing the equilibrium of a circulation disturbed by bleeding and surgical shock.

It seems to me that we are coming now to a more scientific understanding concerning the proper regulation of diet in surgery. Much restriction formerly advocated because of the almost invariable occurrence of surgical fever, is now recognized as unnecessary.

We know that pyemia, septicemia, sapremia and kindred complications are due usually to what the surgeon puts into, or allows to remain in, the wound rather than to what the patient puts into his own stomach. Surgical textbooks of recent publication, however, are not altogether guiltless of teaching an erroneous causation for post-operative complications. Errors in diet may cause fever and other undesirable symptoms, but their power for evil should not be overestimated. After many capital operations, the patient may return to an ordinary diet on the third or fourth day.

I am often surprised to see a great amount of cotton and a splint used as a dressing for a comparatively insignificant wound of a hand or arm. A few pieces of gauze, but little larger than the wound, saturated with collodion is all that is really needed in many such cases. Great bundles of dressing restrict harmless motion, often make the patient sensitive about mingling with his acquaintances, and are nearly always unnecessary and almost unjustifiable.

In conjunctivitis, iritis, keratitis and wounds of the eyeball it is seldom necessary to keep the patient in the house. A pair of dark glasses to exclude glaring sunshine or the sealing of the inflamed or injured eye with plaster is usually the only restriction needed, except that reading with either eye is to be avoided. Imprisonment in a darkened room is almost never required.

Routine restrictions belong to the methods of those who allow others to do their thinking, and who attempt to practice surgery by "following the leader," as do children in a game.

Dr. Griffith, Kansas City—I do not think that any one at present would put a fractured tibia and fibula in a plaster cast and keep the patient on his back for six weeks. I understand that in many cases of tubercular spine, plaster-of-paris will not do and is not the accepted treatment; that the supine position with or without extension on a parallelogram, especially when the vertebræ of the cervical region is involved, is the only treatment. I have had a case of this kind in my own family, and if I had it to go over again this would be my treatment, as it is the advanced method and gives better results than a cast or jury mast. No one thinks a moment of keeping little ones indoors all the time, and in compound fractures or resection of the elbow, wrist or shoulder joints, no one thinks now of keeping them in bed or confined to a room.

Dr. McLean, Detroit—The paper of Dr. Roberts struck me as containing a great deal of common sense. Some of us remember what a strict regimen used to be observed about twenty-five years ago after operations. I believe much of it to be unnecessary, or even injurious. I recently performed an amputation of the shoulder, and on the twelfth day after the wound was entirely healed, the patient walking about in perfect health, and I exhibited him on that day before our local society. In another case I performed an amputation at the hip joint, and on the fourteenth day I exhibited him also, walking on crutches and in perfect health. In both of these cases the restrictions as to diet and confinement were much simpler than is the usual practice to-day. I have come to believe that in fractures of the thigh no extension at all is necessary in many cases. To lay down as an orthodox law that in every case extension

is necessary is not right. We have too many fixed rules.

DR. THOMAS, Pennsylvania—I believe there are certain points to be considered. Sometimes surgeons are brought into court charged with malpractice in the treatment of a fracture. If the splint has been taken off sooner than the books say, the attorney for the plaintiff has a case. There was an instance of this kind in our city a short time ago, where a surgeon was mulcted $5,000 for having let the patient out three weeks after a fracture of the tibia and fibula. If he had been orthodox in his proceedings this unfortunate result would have been avoided. I don't think splints are taken off much too soon, and in justice to ourselves we should not take them off too soon.

DR. MARCY, Boston—A common practice among surgeons on both continents to-day is the elaborate preparatory treatment, which has great disadvantages, in that it keeps the patient in suspense for several days before the operation. Another practice among many is that of getting at a result by several stages. I am in the habit of doing three or four or even more operations at one sitting, which it is customary to do in as many sittings, and I think with great advantage to the patient. I also want to speak of the employment of collodion dressings where no drainage is necessary—to recommend it.

DR. ROBERTS—In closing the discussion, I will say my object has been to emphasize the fact that no surgical injury, process or disease should be treated in a routine manner.

TUMORS OF THE NECK.

Read before the Section of Surgery and Anatomy, at the Forty-fourth Annual Meeting of the American Medical Association.

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No region of the body is so prolific in neoplasms as the neck.

No region of the body is so important from an anatomical and surgical standpoint, containing as it does many great vessels and nerves, the integrity of which is essential to life. Therefore, the diagnosis and treatment of morbid growths in this situation is of commanding interest.

Never passed the time since surgery has been practiced as an art, that its followers everywhere have not approached operations upon the neck with the greatest caution, if not trepidation.

While a proper amount of anxiety should attend all operations in so vital a spot, I shall endeavor to show that the danger incurred in the removal of tumors from the neck, varies as widely as the many neoplasms differ histologically.

Tumors superficial to the deep cervical fascia are comparatively easy of diagnosis and safely operable, presenting no greater danger than similar growths in other regions of the body.

The only vessel of importance is the external jugular vein and this can usually be avoided as it is a prominent landmark in the neck. The danger from cutting it is not great. I have twice wounded it myself and have seen others do so, without trouble. Tumors originating beneath the deep cervical fascia, on the other hand, present the greatest difficulties in their diagnosis and removal.

Tumors of the neck are common at all ages. They are congenital and acquired, cystic and solid, benign and malignant. This region is preëminently the site of congenital cysts and I know of no other which compares to it in this respect. Many tumors which are usually thought to be acquired are congenital, being held down by the deep fascia and prevented from appearing externally. A congenital cyst may not form a distinct and well outlined tumor until adolescence or middle age. This knowledge is of great value in diagnosis and treatment.

Cysts as they occur in the neck embrace almost every known variety:

1st. The simple, serous or unilocular cyst is frequently met with in the subclavian triangle and may pass downwards under the clavicle into the axilla or chest. They contain as a rule a colorless, limpid fluid and are usually called "hydroceles of the neck."

The cyst is congenital or acquired and may be above or beneath the deep cervical fascia. It is usually translucent and covered by smooth, thin skin of natural color. The aspirator would settle the diagnosis in any doubtful case. These cysts are supposed to grow from the branchial clefts and have been accurately described by Maunoir, Phillips and others.

Treatment.—When practicable they should be excised. When deeply attached, it will be better to excise a portion of the cyst wall, drain freely and plug with iodoform gauze. The old treatment of tapping and injecting with iodine, carbolic acid., etc., is uncertain and dangerous. Setons are more so. Spontaneous recovery has followed accidental rupture.

2nd. The second variety of cyst encountered in the neck is the compound or multilocular—the cystic hygroma of some authors, the lymphan geioma cysticum of others. It is generally congenital and develops from the lymphatic vessels. It is most obnoxious to the carotid triangles. The different compartments of these cysts vary in size from a small shot to an orange. Their contents vary as widely as their size. Every sort of fluid, semi-solid and solid materials may be found in them. They are usually situated beneath the deep fascia, but, may perforate it and present superficially.

They are attached to everything—vertebræ, muscles, vessels and nerves, which makes their removal always a serious matter, often an utter impossibility.

No other treatment, however, is at all satisfactory, and most authors recommend excision with all its primary and secondary dangers. The internal jugular vein, carotid artery and pneumogastric nerve have been excised in removing these growths, the patients in some instances making excellent recoveries. They are recognized by their tuberculated outline, fluctuation, and preference for the carotid triangles.

3d. The bloody cyst or hematocele may be met with in the neck. Sometimes they are hydroceles into which a vessel has ruptured. There is, however, a true bloody cyst intimately connected with the great vessels. Their contents resemble blood, and it is said that they are cyst-like dilatations of the internal jugular vein. They may or may not communicate with the interior of the vessel. Subsidence of swelling upon gentle pressure would be an evidence of such communication, and a useful hint as to treatment as well.

4th. Sebaceous cysts are frequently met with in the neck. They are superficial and deep, usually the latter, as pointed out by von Langenbeck, differing in this respect from similar cysts in other parts of the body. Superficial sebaceous cysts are likely to occur in the thyro-hyoid region and are easily enu-

cleated. They may attain the size of an orange. Deep epidermic cysts are according to Gross, invariably situated in the superior carotid triangles—usually the left. They are frequently connected with the sheath of the vessels, and when the head is in certain positions pulsate synchronously with the heart. They give a pulpy fluctuation which is best elicited by putting one finger in the mouth, the other over the tumor. Von Langenbeck advises extirpation with all of its risks and hazards.

5th. Bursal cysts developed from the two normal bursæ situated along the middle line of the neck are infrequently found. The upper bursa is found between the hyoid bone and thyroid cartilage; the lower and larger one between the thyroid cartilage and skin. These tumors are diagnosticated by their situation, viscid contents and obedience to the movements of the larynx. They are rarely so large as a walnut.

6th. Hydatid cysts have in rare instances been found in the neck. Erichsen reports two cases. One removed from the subclavian triangle of a woman upon whom he had previously operated for hydatids of the liver.

7th. Along with cysts may be mentioned the air cyst or goitre aèrien. It is caused by hernia of the mucous membrane of larynx or trachea through their cartilages or rings respectively. They disappear upon pressure, vary with respiration and enlarge after exertion. It is a rare affection and occurs in those who use the voice constantly, as the auctioneer or public crier.

8th. Thyroid cysts are less common in America than in the mountainous regions of Europe and India. They are particularly common in the Alps and Himalayas. I have seen many well marked thyroid cysts in Kentucky. These cysts which are usually multiple, generally affect the lobes of the thyroid glands rarely the isthmus. The right lobe more commonly suffers, which will place these tumors in the right inferior carotid triangle. The cysts vary in size from a pea to a fist and contain different kinds of fluid—rather viscid, bloody with an abundance of cholesterine.

They obey the movements of the larynx. Women suffer more frequently than men. The trachea may be pushed well to the opposite side.

Treatment.—If the disease is limited to either lobe, the proper treatment is by excision. Prof. Kocher of Berne, who has lived for years in a goitrous district and has excised the thyroid gland in whole or in part far in excess of other surgeons, is emphatic in his approval of partial thyroidectomy, but condemns removal of the entire gland.

Myxœdema follows the latter operation in nearly every instance. He followed his cases carefully and in only two out of eighteen complete thyroidectomies were the symptoms of myxœdema wanting. In both of these the bronchocele returned, and it is fair to assume that he did not remove the entire gland. Of twenty-eight partial thyroidectomies the general health of the patients did not suffer any. The experience of other surgeons has been not unlike Kocher's, and few if any advise total extirpation of the gland. If a portion of it is left the distressing and fatal symptoms of myxœdema do not occur.

Where excision is not practicable, incision and drainage should be followed. Tapping and injections while curative in some instances are on the whole more dangerous and less certain than incision.

The other enlargements of the thyroid gland may as well be disposed of now. Benign tumors do not affect the thyroid, and the only innocent affection of a solid nature to which it is liable is the fibrous bronchocele. It is simply an hypertrophy of the normal glandular and connective tissue. It may affect the entire gland, but, like cystic disease in this situation, is most obnoxious to its lobes, especially the right. The isthmus rarely suffers alone. Circumscribed hypertrophic conditions of this gland are by some called adenomata. Enlargements of this body in goitrous districts are frequently associated with cretinism.

Per contra, idiocy, so far as I am advised by the superintendent of the feeble minded institutions of this and other States, does not predispose to enlargement of the thyroid.

Malignant disease—carcinoma and sarcoma rarely affects the thyroid. Cancer is by far the more common affection and may exist as encephaloid or scirrhus. It appears late in life.

Treatment.—Nothing can be done for malignant disease. The only hope would be in complete removal of the gland and this is certain to be followed by myxœdema.

The solid bronchocele should be excised under the same rules governing operations for cystic disease.

In very exceptional instances there may be accessory thyroids in the neck—within the larynx, trachea, etc., and they give rise to the same enlargements peculiar to the normal gland. Benign solid neoplasms are found in all parts of the neck. The most usual growths are lymphoma, enchondoma, fibroma and lipoma. There is besides a local hypertrophic condition of the skin which at times is so distinct as to give the appearance of a tumor. The vessels in the affected area are much enlarged. This is really a naevoid condition.

Lymphomata are the most common of benign growths. They will generally be found in the submaxillary, occipital and subclavian triangles. One gland is as a rule affected. Enchondoma is practically limited to the submaxillary triangle where it affects the submaxillary salivary gland. I have never seen it in any other region of the neck.

Fibromas are not specially common, and when they do occur, do so indifferently. No region is specially liable to them.

Lipoma or fatty tumor while not frequent is sufficiently common in the neck. They are very generally superficial to the deep fascia, and when so are easy of removal, whatever their size. My belief is that they are more commonly situated in the inferior carotid triangle than other parts of the neck. They may attain an enormous size as shown by the photographs which I pass around, kindly sent me by my friend Dr. Samuel Swope, of Marion, Ky. Each had grown from twenty to twenty-five years.

Sterno Mastoid Muscle.—There is a circumscribed swelling of the sterno mastoid muscle, which is at times so pronounced as to give decidedly the appearance of a neoplasm.

Bryant and Holmes, who have specially investigated the subject, speak of it as if it were peculiar to the newborn infant and due to some injury (they are more common in breech presentations) during parturition. It unquestionably occurs in adults. I have seen two well marked examples of this affection.

Three years ago a farmer about 55 years of age,

living in Indiana, presented himself at the surgical clinic of the university with a well marked circumscribed swelling in the right mastoid muscle. No history of syphilis or trauma. The muscle could be lifted up sufficiently to clear up any doubt as to diagnosis. This man was given iodide of potassium, blistered locally, and was practically well within a fortnight.

Malignant Tumors.—Malignant disease of the neck may show itself in at least three different varieties. There are sarcomas, carcinomas, and the local enlargements incident to Hodgkins' disease—or as we prefer to call it, lymphadenoma. Sarcomas are more frequent than carcinomas.

Cancer never begins in the lymphatic gland primarily, and sarcoma does so but rarely.

Both sarcoma and cancer are in my judgment usually found after forty, and are likely to be situated in the occipital or submaxillary triangles. Sarcomas give a most deceptive sense of fluctuation when well advanced. The skin is discolored a deep red or violaceous hue and in time ulcerates. Hemorrhages take place from time to time and aid in hastening the end. Sarcoma attain an enormous bulk.

Treatment.—Unless seen and diagnosticated early, these cases are in my judgment not operable. No operation for malignant disease promises success unless considerable tissue can be sacrificed. This can not be done in the neck.

These growths are always more adherent than they seem to be, are exceedingly vascular, often accompanied by enlarged glands which renders their complete removal a matter of impossibility. The primary and secondary dangers are so great from operations for the removal of these growths that the wise surgeon will, as a rule, decline to interfere, for at best he has little prospect of doing substantial good.

Lymphadenoma affects the lymphatic glands of the neck early in the disease. The diagnosis of this affection can only be confounded with tubercular adenitis; as a rule, no trouble should be experienced in differentiating between them.

Tubercular glands always begin in the submaxillary triangle, whereas, in lymphadenoma the enlarged glands are first seen in the carotid and subclavian triangles. Tubercular glands are as a rule, small and unilateral—in lymphadenoma larger and bilateral.

Tubercular glands often break down—lymphadenomata rarely do so. Above all, tubercular glands are most common between ten and thirty years of age; lymphadenoma occurs at any age and *men* are more liable to it than women.

Tubercular adenitis runs a chronic course; lymphadenoma an acute one. Surgery promises but little in lymphadenoma.

Tubercular Glands.—No paper upon tumors of the neck would be complete without a description of the most common of all swellings in this region—tubercular lymphatic glands.

While these growths are inflammatory and not neoplastic in origin, still their history and operative treatment so closely resemble neoplasms that clinically we treat them as such. They are most common between ten and thirty years of age. The African and mulatto are very liable to them. They are unquestionably due to the tubercle bacillus which gains entrance through a lesion of the skin, mucous membrane, socket of carious teeth, etc., and is then carried by the lymph vessels to the nearest lymphatic gland and deposited in its interior. The first glands affected are almost invariably the submaxillary. At first a single gland is enlarged, later on when it is no longer able to filter out all of the tubercle bacilli they pass to the neighboring gland, and so on possibly until the entire chain in this region, superficial and deep, become implicated in the tubercular process. So that we have first the submaxillary glands enlarged, next the occipital, lastly the subclavian. These all belong to the superficial chain.

The deep lymphatic glands are situated immediately beneath the sterno mastoid muscle from its origin to its insertion. These, in part or in whole, sooner or later join in the tubercular inflammation.

In the advanced stage of this affection every gland on one or both sides of the neck may be enlarged. It may run an acute, subacute or chronic course. Death may follow from miliary tuberculosis within a few months, or the disease may remain localized in a single gland for many years. The lymphatic glands are truly the "watch dogs of the system," and it depends upon how well they do their work what is to be the fate of the individual; as long as infection of other tissues, especially the lungs, is prevented, the disease runs a safe course. The capsule of the gland aids materially in localizing the germs and spores and preventing infection of the surrounding paraglandular tissue.

Separate for a time, tubercular glands usually fuse together, moving as a whole, the outlines of each, however, being usually distinct.

The first infected are the largest, possibly attaining the size of a walnut, while those involved late in the process are no larger than a pea. Tubercular glands may become caseous or break down; those first affected are most likely to do so, but they do not suppurate in a literal sense. The fluid or so-called pus is sterile.

Sometimes an acute process is engrafted upon the chronic; the glands becoming affected secondarily by the ordinary pyogenic organisms. Then true suppuration occurs and the glandular tissue and tubercle bacilli are destroyed by the acute process which ends in abscess and drainage—a fortunate ending when only one or two glands are involved. Acute suppuration taking place in a large number of glands could only hasten death.

Treatment.—If modern bacteriology and pathology go for anything, we should not be in doubt as to the treatment of tubercular glands in the neck or elsewhere. Exposure of the diseased parts by a free incision, so that each gland can be seen, felt and completely extirpated, along with its capsule, constitute the ideal treatment. When it is practicable Professor Senn advises—and I think wisely—that the entire chain of diseased glands should be removed en masse. An incision from the mastoid process to the angle of the lower jaw and thence along its lower border, would give free access to the glands usually enlarged. Senn removes the submaxillary salivary gland if it is at all suspicious, also the lower portion of the parotid. The occipital and subclavian glands are easily reached and enucleated.

If the deep chain of glands situate beneath the

mastoid muscle are to be removed, one or two plans are open to the operator. An incision along the anterior or posterior edge of the mastoid may be made in order to gain access to the diseased glands. The fact that the carotid artery and internal jugular vein have been injured in so many cases is sufficient evidence to me that these incisions do not sufficiently expose the parts, and the surgeon depends entirely upon the sense of touch.

Billroth cut the jugular vein sixteen times in 128 operations.

So that the operator shall see and feel every enlarged gland, the sterno mastoid should be cut across about its center, and each end reflected back. Afterwards, the muscle should be sutured with over-prepared catgut or iron dyed silk. The head should be held in one position to facilitate union of the ends of the muscle.

The results of Billroth, Fraenkel, Schnell and others who have done many operations for tubercular glands, are quite as encouraging as an optimist would expect. About 25 per cent. of the cases operated upon suffer relapses and require a second or third operation.

When we remember that enlarged tubercular glands threaten life as long as they remain in the body, each being a focus for subsequent infection, and that in at least one case out of every eight miliary tuberculosis of the lungs follows, who can doubt what his duty is when a case of this kind comes to him for advice?

Dr. Maclean of Detroit—The author discountenanced tapping and injecting the so-called hydrocele of the neck; for myself I will say that I have tapped and injected with iodin in a large number of such cases a great many times and I have never had occasion to regret it. I have never known of a failure.

With cystic goitres it is another matter; I occasionally get good results—not always. Sometimes the patient will allow tapping and injection when he will allow nothing else.

I have accidentally cut the jugular vein a good many times and never had any bad results; there is no great danger attached to the accident. There are many questions connected with this subject that are valuable, but I will merely say that I am personally grateful to the author for the manner in which he has dealt with it.

Dr. Mudd of St. Louis—I think the reader's classification of tumors of the neck a valuable and helpful one. The diagnosis of the individual case is often a difficult matter.

I don't regard the division of the jugular as very important.

The treatment of cysts of the neck in my hands has been most satisfactory by excision and I regard it as better than tapping and injections. The question has come up in my mind this morning, as it has many times before, whether myxœdema following extirpation of the glands is as likely to occur here as it does in the countries where the condition is of so much more frequent occurrence, and from which the statistics are compiled. It is my belief that it is not.

Dr. Rodman—I thank the gentlemen for the favorable reception they have given my paper.

I find that the treatment by tapping and injection has effected many cures in eminent hands, but I regard excision as safer and better.

SELECTIONS.

Tracheotomy and Intubation in the Children's Hospital at Zurich.—By G. Baer.—In this hospital the surgical department of which is under Von Muralt's direction, O'Dwyer's intubation has been carefully practiced, and always with good results, so that now in all diphtheritic cases, stenosis of the larynx, etc., whenever indicated, intubation has become the primary operation. Baer gives the entire history of all cases which occurred from the founding of the hospital in 1874 until 1891. Careful tables of statistics in which are classified the total mortality, the years and seasons in which the cases occurred, ages of patients and the percentage of recoveries from the operation, according to the nature of the disease.

The number of cases reported is 690, of which about 43 per cent. resulted fatally. In 60 per cent. of the cases classified as to age, the youngest have the greatest mortality. Up to the first year of age about 75 per cent. succumbed, and from the eleventh year, only 8.3 per cent. The total number of operations (tracheotomy and intubation both) was 404. During the years 1874 to 1888, tracheotomy only was resorted to in about 323 cases. Later, when intubation was practiced only seven tracheotomies were performed, mostly on account of great swelling of the tonsils with closure of the nasal passages, which rendered intubation impracticable. Seventy-four cases were submitted to intubation, upon nineteen of which tracheotomy was subsequently performed. The mortality of the 404 operations is about 256, or 63.4 per cent. Out of the 323 patients on whom tracheotomy was performed 210 died; of the eighty-one intubations only forty-six succeeded.

The mortality statistics of the entire number, including the non-operative cases point strongly in favor of intubation. More striking is the difference in the more dangerous cases of early life. From the first to the sixth year fatal cases in which tracheotomy was performed showed about 51 per cent. and in intubation only 41 per cent., a good 10 per cent. difference in favor of the latter. Besides, during that period in which intubation was entirely resorted to, a great majority of the cases were those of complicated pharyngeo-laryngeal diphtheria, whereas the more simple laryngeal cases were few. The result is all the more noteworthy in that this hospital receives as a rule smaller children. Thirty-five of those intubated were under three years of age.

Following these general statistics is a history of the seventy-four intubation cases with clinical observations, which on the whole overrule the objections made against this operation.

Baer follows the O'Dwyer method except in one point—he does not remove the string from the tube, but fastens it securely between the teeth. This not only prevents the tube from being swallowed or slipping down, but also renders the use of the extubator unnecessary. The withdrawal of the tube can be quickly accomplished with the finger by the nurse in critical moments, and as a re-intubation seldom requires immediate performance this makes the operation more practicable in private practice.

Baer attaches no importance to Escherich's objections, that it adds to the danger from pneumonia, and that the tube prevents expectoration. Although 44 per cent. of the seventy-four cases had pneumonia which had already existed at the time of operation, or had followed it so quickly that it could not be considered as due to the operation itself. In only four of the patients operated on this might have possibly been the case, but the author calls attention to the fact that inflammation of the lungs also follows tracheotomies and if appearing at all, comes somewhere between the third and sixth day after the appearance of diphtheria, so that causes beyond the operative procedures seems to be responsible for this.

The objection that expectoration is less than through the wide tubes used in tracheotomies, Baer refutes, by stating that occasional swabbing out of the throats of intubated patients is quite efficient in removing clots of mucous, membrane, etc. No doubt in children, what is coughed up is immediately swallowed and no evil results from it, such as secondary diphtheritic infection of the alimentary canal. At all events, the clearing of the tube gives sufficient supply of air and if the openings at the head of the tube are made a trifle smaller, this can only be more favorable for expectoration as it can be more readily accomplished through a small than a large opening. Accidents during the operation (intubation) there were none. In only one case the tube persistently took the wrong direction into the trachea, and the patient was finally cured by tracheotomy. This, by the way, was the only case where a secondary operation was required. Swallowing of the tube, or slipping into the trachea never happened, nor asphyxiation from accumulation of secretions on the tube. There were also no injuries from intubation, to avoid which great care must be exercised in the selection of tubes which are not too large. That pieces of membrane may become crowded down into the trachea during the operation, the author admits, but considers this accident very rare; in such cases tracheotomy can be resorted to. Usually, however, the membrane is gotten rid of in the natural way, through the tube or by coughing. In order to avoid this complication, tubes with a short shaft should be used like O'Dwyer's model of 1890, the shaft of which is only 3 cm. long. The opening in the head piece is larger than in the older models in order to facilitate expectoration. The coughing up of the tube should be regarded more as a favorable than an unfavorable occurrence. When this happens during the first few days after the operation, it is usually followed by coughing up of tough masses of membrane; if happening later, it is almost always a sign that the larynx is returning to its normal condition; it is so to speak, a spontaneous expulsion. In all of the cases, however, there was plenty of time for the physician to replace the tube. It must be admitted that with intubated children, catarrhal disturbances and difficulties of nutrition were frequent, but patients upon whom tracheotomy has been performed suffer from this also. These difficulties can be met in various ways. If fluids can not be swallowed, semi-fluids may be tried, or swallowing with the head laid low, or the tube may be temporarily removed.

The different alterations and remodelings which the tube is undergoing from time to time, promises relief in this direction. In the Zurich hospital, as well as by O'Dwyer himself, such changes have been attempted. The author adds several chapters on the practice of intubation in cases of chronic stenosis in patients upon whom tracheotomy has been performed, and also in the acute stenosis of non-diphtheritic patients.

On the whole, the work is deserving of great praise and can not fail to gain new friends for intubation.—*From the Centralblatt für Chirurgie*, July, 1893.

BOOK NOTICES.

Dunglison's New Pronouncing Medical Dictionary. A new edition of Dunglison's Medical Dictionary, by RICHARD J. DUNGLISON, is announced as in press for early publication. It has been thoroughly revised and greatly enlarged, and will contain about 44,000 new medical words and phrases. Pronunciation has been introduced into the new edition by means of a simple phonetic spelling. In the new edition much encyclopædic information, difficult of access elsewhere, will be found conveniently at hand. Especial attention has been devoted to matters of practical value. A review will appear in an early issue.

A Defense of Gastronomy. When a physician, who also has just claims to the title of philosopher, discourses entertainingly upon a subject of universal interest, his statements should receive attentive consideration; but when the author is an American and a veteran medical editor, he has the right to demand from us not only a hearing, but also a favorable judgment. DR. DANIEL G. BRINTON has just favored the public by writing a book on "The Pursuit of Happiness" (Phila., 1893), which abounds in wit and wisdom, and in which he summarizes the experience of an observer of unusual qualifications for the task which he has so well completed. As gastronomy is a medical topic, we extract the following paragraphs on this subject from Dr. Brinton's work for the entertainment of such of our readers as are interested in the æsthetic relations of dietetics:

"All nations of culture have connected a certain solemn joy with the act of taking food. To "break bread" with one is the expression of the sweet sentiment of hospitality, and for the lovers to share the same loaf before the High Priest was the simple and beautiful marriage rite among the ancient Romans. The "love-feasts" of the early Christians were the repetitions of the only ceremony which their Founder prescribed; and science traces to appropriate nutrition the growth of both physical and mental abilities. The devout Novalis called meal times the 'flower-seasons of the day,' and claimed that all spiritual joys can be expressed through the service of the table. Can there be anything in it unworthy or debasing?

"In the light of such declaration should we look on our food-taking, and not merely as feeding and filling. Were the kitchen more of a studio in American homes, we should see a higher style of art in the drawing-rooms. The worst preparation for a day's work is a poor breakfast and its shabbiest reward is a bad dinner. If our daughters studied more diligently what the Italians call the *melodia del gusto*, their married lives would be attuned to a more harmonious accord.

"Consider the appointments and symmetry of a well served dinner in that high style of art which the French have brought to perfection. The mere sight of the table awakens our æsthetic feelings, disperses the cares that have infested the day and softens the asperities which its rude conflicts have developed. The snowy cloth with its embroidered center piece, bearing a vase of roses or restful green; the gay triumphs of the potter's skill, flanked by polished metal and diaphanous crystal, whose varied forms hint of the manifold gifts of the grape; the chairs so disposed as to suggest how we should live our whole lives—ever near to others, but not jostling them. Then how rhythmical the progress of the repast! the cold, salt shell fish, followed by the hot and spicy soup, harmonized by the neutral flavor of the fish, its creamy sauces relieved by the bare suspicion of the clear acid of the lemon; and so on through the courses, until the aromatic coffee and the tiny glass of liqueur, redolent of wild herbs or of Alpine flowers, remove both thoughts of food and a sense of satiety.

"The sequence of such a repast is not a conventionality. Medical men as well as epicures know that it is based on physiology. Once, with a friend of like inquiring mind, I ordered a dinner at a restaurant of renown, exactly reversing the usual sequence, beginning with Chartreuse, coffee and ice-cream, ending with soup, oysters and hock. The experiment convinced us that the received is the right sequence, and we made no second attempt to put the wrong end foremost.

"Many will cry that such a dinner as I describe is one for the millionaire and not for the million. They are in error. In France, I have partaken of such in families of very humble means. They are in fact economical. At an ordinary American dinner, I have seen seven vegetables and two meats served at once. Half the number would have set forth a much better repast, if served in the French manner. Moreover, an elaborate dinner is not desirable daily, but to have one, say weekly, is as improving as going to the opera or listening to a great poet read his own verses.

"An essential precept of gastronomic culture is to cultivate a taste for all customary dishes. Every locality has its own. Snails and mussels and cockscombs are favorite dishes in Paris, but I have found few Americans enlightened enough to be willing to like them. A broad taste adds to one's pleasure and that of others. How disappointing the guest who refuses dish after dish planned with an eye to his pleasure.

"Do not be ashamed of the enjoyments of life which are derived from judicious eating and drinking. There are no more accurate standards of a family than its table manners, table service, table talk. Culture is reflected in them as in a mirror. Care not if the bigots and Pharisees call you a wine-bibber and a glutton. You will not be the first to whom they have applied those epithets, and you need not be ashamed of your company."

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This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues and subscription for THE JOURNAL. Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership. On receipt of the above amount the weekly JOURNAL of the Association will be forwarded regularly.

SATURDAY, AUGUST 19, 1893.

THE TREATMENT OF TYPHOID FEVER.

In the topic which heads this editorial the medical profession is certainly as much interested as it is in the treatment of pulmonary phthisis. The able papers and discussions which we have presented to our readers in the columns of the JOURNAL during the past few weeks have been of great value as reflecting the opinions of active practitioners whose practical experience is of inestimable service to less favored colleagues, yet the fundamental rules governing the management of enteric fever are not modified by these expressions of opinion. Differences in belief may exist, whether intestinal antisepsis is desirable or obtainable in typhoid fever, and whether this temperature or that, is to be treated as a dangerous symptom, but the important fact that enteric fever is a disease in which good nursing and watching are the real factors productive in bringing about recovery, is universally recognized. In typhoid fever above all other diseases the physician must recognize that a cure is impossible, that he can guide the patient through the storm but not stop the storm, and that the only object he may expect to accomplish is the control of symptoms which directly or indirectly affect the patient unfavorably. While he may not be able to remove the cause of the symptoms the very relief may be advantageous. Thus a delirium indicative of great mental or physical distress, or the presence of some complication inducing pain may so exhaust the patient's vitality as to seriously impair his chances of recovery, and measures directed to the relief of these symptoms may save the particles of strength needed to carry the case over some crisis in his attack. There is therefore no specific or routine treatment by internal methods which should be resorted to when the diagnosis of typhoid fever is established, but there are two external methods aside from feeding which may be applied to so nearly every case as to be called routine, namely, absolute rest in bed flat on the back, and the use of the bath in a more or less modified form. A simple mixture designed to maintain free action of the kidneys or stomach may be ordered in each case, chiefly to comfort the patient and his friends, but beyond this nothing is to be used without a distinct indication by some prominent symptom.

The necessity of absolute rest in early stages of enteric fever is known to every one, yet it often requires the most strenuous efforts on the part of the physician, particularly if not aided by a trained nurse, to maintain the degree of rest necessary. If there is one factor potent in rendering a prognosis unfavorable in enteric fever it is the neglect of this precaution in the smallest detail, and every rising to stool may be regarded as a most unfortunate cause of future trouble and danger.

The use of the bath, or more correctly water in any form during typhoid fever, stands next in importance and next in its approach to routine. It is a mistaken idea with many physicians that the water treatment of typhoid is solely indicated by high fever. Nothing can be more erroneous. While high temperature is without doubt a most important indication for the bath treatment, extreme restlessness is also a positive reason for its employment. Further than this there can be no doubt that the use of water not only lowers excessive temperature but prevents its rapid return and in some way advantageously modifies nutritional changes. Restlessness and insomnia accompanying fever too slight to require the full bath are often entirely relieved by a tepid sponging which soothes the irritated skin and equalizes the circulation, refreshing and invigorating the patient. Each part so sponged should be immediately rubbed dry so that the patient may not be relaxed by soaking. We presume this does not apply to the cases of high fever in which friction with the hand must be used to bring the blood to the surface where it may be cooled. We have not tried to indicate in this article the medicinal treatment required by various complications, as space forbids, but we are sure that if these views are followed complications will be less frequent and a firm basis maintained for rational measures sometimes necessary for the relief of accidents.

THE PAN-AMERICAN MEDICAL CONGRESS.

With the next issue of the JOURNAL we will complete the publication of the preliminary programs of the different Sections of the coming Congress. All doubts that have been expressed concerning its success are now set at rest, and this Congress is destined to go into history as one of the most successful medical meetings ever held on this continent. It is no disparagement to the Ninth International Medical Con-

gress to make this assertion, for the managers of that Congress had the constant and determined opposition of many of our most influential medical leaders, and of the medical press east of the Alleghanies.

Happily, DOCTORS PEPPER and REED have encountered no such fierce opposition; a united American medical profession have marched under their leadership in the most harmonious fashion and without the slightest friction or bitterness.

Contrary to the general opinion, our colleagues from the other Americas and the Islands of Pan-American seas, have generously responded to the call, and they are well represented upon the program of every Section. They will be welcomed with true Pan-American hospitality, and we trust that this meeting will signalize the beginning of that bond of fraternal union which all Americans hope may grow stronger with each recurring triennial.

The Washington committee have left nothing undone that would inure to the success of the meeting, and the Congress of the United States in making a liberal appropriation for it, were governed by motives of patriotism, and the spirit of encouragement of the liberal arts and sciences.

From a scientific standpoint the program of the Congress leaves little to be desired; there might in future Congresses if any are to be held, be fewer sections and more consolidation, but in a country where every man is a born leader he must have something to lead. Moreover, the experience of this organization will be of great service to those that are to follow. Meanwhile, let us in advance heartily congratulate PRESIDENT PEPPER, SECRETARY GENERAL REED and the other officers of the Congress, on the assured prospect of the undisputed and deserved success now about to crown their labors.

ASPECTS OF AMERICAN PHARMACY.

The *Chemist and Druggist*, July 29, treats briefly of an apparent downward tendency in the pharmacy of this country. It implies that while there are still men of high caliber in the front ranks, the days of "the Parrishes and Procters are ended." The rank and file are not satisfactory, chiefly because the door of entry into that department of life work is too wide and too easy, and also because there are too many stores. Competition is too great to enable good workmen to sustain themselves.

Another fault is found in the loose organization of boards of pharmacy; and the latter are or may be so administered that their qualifying examinations are far from being a test of sound professional knowledge. The remuneration to be obtained by the members of such boards is commonly quite inadequate to command the services of the best men.

"Some teachers, a few examiners, and some prominent pharmacists have endeavored to warn the trade of the evil, and have urged prompt remedies; but there is no sympathy with such notions, and the immediate result is that young men of good education give pharmacy a wide berth. What appears to be necessary before American pharmacy can take its rightful position is that—

1. An examination in English, arithmetic, and Latin, or French, or German, should be instituted and passed by candidates before commencing apprenticeship.

2. Evidence should be produced to show that candidates for a license have been engaged for four years in dispensing and making pharmacopœial preparations, one year at a college of pharmacy being recognized as part of the period.

3. The boards of pharmacy should be reconstituted so as to free them from executive functions, and devote themselves solely to the examination of candidates. With this object, only men of distinguished collegiate career who are known to be up to date in all the branches of knowledge pertaining to pharmacy should be appointed, and the honorarium should be such that the best men can afford to give their services.

It is the opinion of some of those best capable of judging in America, that less than 5 per cent. of those entering the drug trade in the United States could pass the English preliminary examination, and probably not 1 per cent. could attempt the Latin paper. It has been even questioned if one in a dozen of the members of the boards of pharmacy could write an English prescription in full Latin. It may be asked why, if that is so, American pharmacists do such good work. Their pharmacopœia touches the high water mark; how can that be? The answer really shows the possibilities of American pharmacy. The workers in research, the men who compile pharmacopœias, are the pick of the thoroughly educated class, some of them naturalized citizens whose early training was obtained in Europe. American pharmacy would be bad indeed if from its 30,000 followers a score or two fit men could not be picked for the best work. But the conditions are altogether opposed to the growth of this class, and unless educational and examination reforms are introduced for the improvement of the trade, the United States pharmacopœia will become an expression of the opinions of teachers or professors and of chemists to manufacturing houses. That is a consummation not desirable from any point of view."

THE MEETING OF THE MILITARY SURGEONS.

To those of the profession who have an interest in the progress of the workers in a particular line, the proceedings of the Association of Military Surgeons will be specially attractive. The Association has a manifold labor before it. It has to build up itself as an association, to reorganize on the most approved basis the medical organizations of its various members and to stir up the energies of our military medical men to a thorough appreciation of the responsibilities of their position. In effecting either of the last two tasks it will accomplish the first—the consolidation of its own organization into a permanent and valuable institution. Probably greater prog-

ress will at first be made in the education of the individual than in attempts to effect changes in existing organizations. Both are needed; but the latter will be accomplished only when a majority of the medical officers concerned have a full and complete knowledge of their duties and responsibilities in war and in peace and of the methods by which they may best be fulfilled. The Surgeon General of the Army has recently established a medical school in which young graduates who have been selected by competitive examination are required to attend a four months' course from 9 A. M. to 4 P. M. daily to prepare them to undertake their medico-military duties. This shows that something more is required than a medical education, a commission and a uniform, to enable one to become a qualified military surgeon. The routine duties of a medical officer of the State military forces are easily learned; but the duties of active service in time of war which in peace he is expected to prepare for, require time, study and practice. Much more than a few days' outing in a summer camp is evidently needful. The Association should formulate its views on the special requirements of candidates for commission, and urge that no medical man be appointed unless he has shown himself possessed of the necessary technical knowledge.

This brings us to the second point, that of organization. Here earnest work will be required to accomplish the necessary changes. It is difficult to get out of the old ruts, but the day of the regimental surgeon and his assistants has passed. The State medical departments should be organized after modern methods to obtain from them at all times their best work and to render them assimilable, in the event of war, with the medical department of the regular army. A staff of specially educated medical officers and a well drilled hospital corps are as essential to the well being of the State troops as to that of the Home Service troops of Great Britain; both may be called upon at any time to take the field. Already our military surgeons are progressing in this direction, and we look to the Association hopefully for the speedy accomplishment of that reorganization which will enable all to be consolidated in an emergency into one compact, U. S. MEDICAL STAFF CORPS.

THE CHOLERA SITUATION.

During the month of April the situation in regard to the introduction of cholera into this country looked quite threatening; in the months of May and June there seemed to be a lull in Europe, but July there was a marked increase in the number of cases and deaths, and also of infected places. This was simply following the history of all epidemics and pandemics of cholera, and it was to be expected that a recrudescence of the disease would occur with the advent of high temperature in many localities. This obtains especially with regard to Russia and France. While the fatality is not so great as it was last year, still in some localities in Russia the mortality is very high. The figures given by cablegram from London for last week are as follows: Podolia 484 cases, 175 deaths; Orel, 327 cases, 110 deaths; Don region, 354 cases, 147 deaths; Kieff, 290 cases, 91 deaths; Grondo, 110 cases, 27 deaths; Nijni Novgorod, 259 cases, 102 deaths; Kherson, 50 cases, 18 deaths; Yaroslav, 38 cases, 15 deaths; Kazyn, 39 cases, 13 deaths; Moscow, not including Moscow City, 27 cases, 9 deaths. In Moscow city there was an average of thirty cases, and fifteen deaths daily. It will be seen that it principally prevails in the southern portion of Russia, while it is true that a few cases have appeared in St. Petersburg this year. This condition of affairs has stimulated the German authorities and there are now only two points through which communication is held with Russia. Hamburg has forbidden and will not allow emigrants from Russia to come to that place, a precaution which if it had been taken last year would probably have saved the city a bitter experience. Germany, also, has forbidden the importation of hay, straw and fodder from Russia for the same reasons. Bremen still receives Russian emigrants, but they are not allowed to be sent to this country until after proper detention and purification and disinfection of themselves and their baggage. Some of them have also reached Naples by way of Odessa and a number of them within the last week arrived in Paris, having been brought there through Baron Hirsch's agency. In Roumania a number of cases have occurred and the authorities have prohibited communication with Russia, in consequence of the occurrence of cases in Bessarabia. Austria has had quite a scare during the last week by the breaking out of cholera along the line of a canal now being dug, the cases occurring among the workmen.

There is still some cholera in Hungary and the lower Danube. In France, cholera has existed in the northwestern portion and is increasing in the southern portion, but owing to the reticence observed by the French authorities, it is impossible to tell all the localities in which it exists. The authorities are pursuing a similar course to that which they took in Marseilles and Toulon in 1884, when they called cholera, cholerine. France evidently is not yet observing the agreement of the Dresden conference of this year, at which each country pledged itself to notify the others of the presence of cholera within its borders. France has always pursued the policy of concealment as much as it possibly could, with the result of more outbreaks of the disease, than if a different course had been pursued. Four vessels with cholera

aboard arrived during July at four separate and widely different localities in England, having sailed from or touched at ports in France or Italy, but so far, owing to the promptness of the authorities, there has not been any spread of the disease. The *Myrtle Branch* arrived in the river Tyne from Nantes; the *Widdington* in Penarth Roads from Marseilles via Malta; the *Blue Jacket* in Cardiff and the *Altmore* at Gravesend, both of the latter having sailed from Marseilles. On the last named vessel was a fireman in a state of convalescence and his case affords an instructive lesson as to the duration of the infection in a person who has suffered from cholera. The *Altmore* arrived at Marseilles on July 3 and left on July 5. The fireman was on shore during the whole time of her stay there, and on July 7 was attacked by very severe diarrhœa (twelve times in twelve hours), vomiting, and cramps. He became faint and collapsed, and the captain gave him quinine and iron. When the ship arrived at Gravesend on July 17, the fireman was still feeble, and although nominally at work was able to do very little. The vessel was cleansed by the Customs officers, and the usual certificate given. DR. WILLIAMS, however, the Assistant Medical Inspector, found the case, and sent him to the Hospital. The presence of the cholera bacillus in the evacuations of the patient was demonstrated by DR. MACFADYEN at the College of State Medicine. This is very important, as it affords further evidence that a patient who might thoroughly be called convalescent was still capable of communicating the infection. It cannot, therefore, be proper to allow patients who have recovered from cholera to leave the hospital until some time after convalescence has been established. DR. COLLINGRIDGE is of opinion that the period ought to be fourteen days. This fact obviously throws a very serious responsibility on medical officers of health. The ship *Altmore*, has been thoroughly fumigated and disinfected with corrosive sublimate under DR. COLLINGRIDGE'S directions; the water tanks have been emptied and cleaned, the bilges disinfected, and all clothing treated with superheated steam. (*British Medical Journal.*) It must also be recollected that it was stated by an observer in St. Petersburg, last year that the comma bacillus was found in the evacuations of a man who was not suffering from cholera. This naturally suggests the question whether this disease may not be spread by walking cases.

At the moment of writing, *The Lancet* just at hand, reports the arrival at Gravesend of the *Bona* from Burmah, with several suspicious cases on board, one fireman having died on the day of seizure by a malady held to be cholera. A Danish steamer on its way from Antwerp put into the Humber on the 2d of August with one of the crew ill from cholera. Since that date four cases have been reported in Antwerp. The *Elizabeth McNeal*, bound from Cherbourg to Rochester, arriving at the Noire on the 2d inst. was found to have a case of cholera on board.

So far, no authentic case of cholera has developed in Germany during the last two months, showing the stringent precautions exercised in that Empire.

The outbreak in Mecca seems to have exhausted itself, while at Bassorah and at a few points in Turkey in Asia, cases have been reported, as also at Smyrna. It does not seem that the returning pilgrims from Mecca have scattered the disease to a great extent. At El-Tor a number of cases have however, occurred, there being still in quarantine at that place over 12,000 pilgrims, and 6,000 more on shipboard.

In Italy a number of cases have occurred at Alessandria and in Piedmont during the last month, and cases are also reported at Rome. The Italian authorities announced that the disease was suppressed at Alessandria. It is plainly evident that the disease existed at other points as on July 19th, Dr. Young of the Marine Hospital service announced the existence of cholera in Naples. This was contradicted by the authorities and for a time the Italian government undoubtedly wished to suppress any indication of the existence of cholera, but the time came when the fact could no longer be withheld, and official announcement was made. An officer of the Italian government went from Rome to Naples and while there contracted the disease and died. Since, the government has forbidden pilgrimage to Rome, and within the last week has placed a medical officer on each train running between Naples and Rome to inspect and take care of such passengers as may be attacked with the disease. In consequence of the unfavorable aspect in Italy the International Medical Congress at Rome has been postponed until April. The Italian government asserts that the disease was introduced into Italy by some Italian workmen coming from Marseilles.

The action of Dr. Young, in communicating the intelligence that cholera existed in Naples cannot be too highly commended, as the importance thereof to this country is shown by the following New York Health officer's telegram:

"Steamship Karamania cleared from Naples on the 15th of July with 471 passengers. Officers and crew sufficient to make up a total of 524 persons. All in good health according to the bill of health. All vaccinated and effects inspected. Signed, Twells, U. S. Consul; Young, assistant surgeon. M. H. S." On the second day out Rosa Buccola, died. Surgeon making autopsy stated cause of death to be congestion of the lungs, and that she was ill when she came on board. The steamer touched at Gibraltar on the 20th, when the consular visa of bill of health was granted by the Consul, who, after writing in the above statement, said "Steamship leaves in free pratique." (I may add that this patient had diarrhœa as well.) The following is the history of the two cases which died just before reaching port:

An Italian, aged 40, was taken suddenly ill. Found in a very prostrated condition. Complained of pain in right side and diarrhœa. Removed immediately to ship's hospital. On August 2d, after treatment, he seemed to be slightly im-

proved. Later on he became rapidly worse, diarrhæa and vomiting. Some cramps in legs and arms. He died at 8 A M. on the 3rd. On the 1st, a woman, aged 23, Italian, began to have diarrhœa. Great prostration; pulse weak. She continued to grow weak. Complained of abdominal pain. Began sinking in the night. Died morning of 3d. Buried at sea. There were several cases of diarrhœa between the 17th of July and the 1st of August on board. The vessel has been ordered to lower quarantine, and passengers will be transferred at once. They will be detained five days at least.

An inspection was made of the passengers, but no new cases found. It was decided, however, and under the circumstances very properly, that all should be transferred to Hoffmann's Island for cleansing, disinfection and observation. After a short time suspicious cases began to develop; these were promptly transferred to Swinburne Island and some of them were pronounced, after the bacteriological examination was made, to be suffering from cholera. Four deaths have so far occurred by this disease, and there are now in the hospital a total of twenty; of these fourteen have cholera, one convalescent, three not having cholera and two suspects. The disease is said to be of a mild type.

It is to be regretted that the improvements at Hoffmann's Island had not been completed before the arrival of cholera.

As it will probably be some time before the immigrants of the Karamania are discharged, it would seem advisable for the health officer to consider carefully the lesson afforded by the Gravesend experience, and to devote his attention to the prevention of the possibility of any infection being conveyed by convalescents. To this end it would be probably desirable to have the evacuations of the convalescents periodically and carefully examined.

The situation in the port of New York now naturally causes anxiety throughout the country, and the responsibility of those in charge is very great. No immigrants should be allowed to land in this country from any ports in France or from any vessels that touch at any ports in France, from Italy, and especially from ports bordering on the northern and eastern portion of the Mediterranean Sea, or from Russia, except under the most rigid surveillance.

The quarantine of the port of New York is again on trial, and it will not do to omit any precaution to prevent the introduction of disease into the United States. While it is true that during the last two or three days no new cases have occurred, there is still danger.

As we go to press, an increased number of cases in Russia is reported by cable, and four cases of cholera among Poles are announced at Berlin, and the disease is spreading from Naples to other coast towns.

DISINFECTION CIRCULAR.

We give in this issue the full text of the circular regarding the use of disinfectants just issued by the Surgeon General of the Army for the instruction of his medical officers. This must be accepted as an *ex cathedrâ* utterance, as it is to the work of Surgeon General STERNBERG as chairman of the Committee on Disinfectants of the American Public Health Association that the profession owes its present advanced knowledge on this subject.

His instructions will therefore receive merited attention from the medical profession, and particularly from municipal and other health officers. He insists on the needlessness of using disinfectants when there is no infectious material to be disinfected, and suggests that even the use of antiseptics and deodorants implies somewhat of a reproach as indicating a neglect of cleanliness and strict sanitary police. Another of the points on which he lays special stress is the unnecessary call for *superheated* steam, requiring a specially constructed steam-chamber, which is so generally found even in official instructions on this subject; free exposure to flowing steam for one hour being sufficient to secure disinfection. The transference of infection by flies from excreta to the surface of meat, milk or other food supplies is also referred to as suggesting the need for careful disinfection in this direction. We commend this circular to attentive consideration in view of present conditions, with cholera at our eastern portals and yellow fever officially announced on our southern shores.

SOCIETY NEWS.

The Association of Military Surgeons of the National Guard of the United States.

Abstract of the Proceedings of the Third Annual Meeting, held in Chicago, Ill., August 8, 9 and 10, 1893.

(*Continued from page 246.*)

At the executive session held in the morning, the name of the Association was changed to "The Association of Military Surgeons of the United States."

SECOND DAY—AFTERNOON SESSION.

The Association was called to order in the U. S. Government Building at Jackson Park at 2 P.M. by PRESIDENT SENN.

The first paper read was by DR. HERBERT L. BURRELL of Boston, entitled

GUNSHOT WOUNDS OF JOINTS.

The author said that all writers agree upon dividing the effect of bullets into zones. Zone one extends up to 400 meters of distance. A 30 caliber bullet has a decidedly explosive effect, but less than 45 caliber. He reported two cases which illustrated the difference in the destructive effects upon the spongy ends of bones entering into the formation of the knee joint, at 350 yards. The skin of every subject of the reception of a gunshot wound is septic. It is the author's belief that all that can be done for a patient receiving an injury at the "line of fire" is—

1. To check the primary hemorrhage by means of tourniquets.

2. To apply antiseptic dressings (iodoform gauze), or some dry antiseptic.

3. To prevent further injury to the patient during his speedy removal to the field hospital.

The author formulated the following conclusions as regards gunshot wounds of the joints with the new 30 caliber projectile: (*a*) that joints having large synovial cavities will have to be thoroughly explored and cleansed, except possibly where the injury has been received at mid and long range; (*b*) that small or superficial joints with small synovial areas will simply require cleansing and tamponnading; (*c*) that it will require a larger number of company bearers, Red Cross workers, and surgeons than have ever been assigned for duty; (*d*) that so far as joint injuries are concerned the new 30 caliber is more humane than the 40 caliber bullet.

DR. LOUIS LAGARDE, U. S. Army followed with a paper entitled,

GUNSHOT INJURIES INFLICTED BY THE PROJECTILES OF HARD EXTERIOR,

which dealt principally with the comparative difference in the destructive effects between the number 30 caliber German silver jacketed bullet, and one 45 caliber leaden projectile. If we look back upon the conditions which influence destructive effects in wounds we will find three factors, namely, velocity of the projectile, resistance of impact, and deformation of the projectile. Projectiles of hard exterior are more humane than those of the old armament. One of the chief causes of death on the field of battle is said to arise from fatal primary hemorrhage. Morandy ascribes 75 per cent. of deaths to this cause. Lidell places the percentage at 30, and Legouest at 18 per cent. These figures, the speaker thought, were founded on mere assumption, because as a rule surgeons are so busy in caring for the wounded after a battle that there is no time to devote to the dead, hence the lack of precise data. With the use of the new armament, he believes the cases of fatal primary hemorrhage will be less. In making this statement he was mindful of the fact that the majority of the writers on this subject entertained the opposite view. He had based his conviction upon the following mode of reasoning, that when the leaden projectile encounters resistant bone, pieces of lead are nearly always detached at the moment of impact. If the momentum of the projectile is still sufficient the pieces of lead are detached, splinters of bone act as secondary projectiles, and the danger to neighboring vessels is consequently increased. As long as the new projectiles beyond the zone of explosion cause less shattering, and they seldom deform, the amount of danger to blood vessels will not be so great, hence the percentage of fatal cases of primary hemorrhage in future wars should be less.

DR. G. D. DESHON of Chicago, read a paper entitled

THE MILITARY RIFLE AS VIEWED BY THE SURGEON.

The author dealt principally with the evolution of the rifle, and exhibited and demonstrated the modus operandi of the rifles used by different nations.

DR. A. C. GIRARD, U. S. Army, read a paper entitled

WOUNDS MADE BY LARGE AND SMALL BULLETS.

The paper was a digest of the past experience compared with experiments recently made on the effects of the small caliber infantry armament. By simple reasoning the author arrives at the conclusion that the energy of a projectile is the main factor controlling the amount of injury inflicted, and if the formula for energy is not correctly applied the whole fabric of the conclusions drawn from experiments with a reduced charge and computed distance is fallacious. Experiments had been recently made with the new small caliber weapons in Prussia which determined that the effects were, if anything, more destructive than those of large caliber guns.

PROFESSOR FINKLER of the Imperial German Army, addressed the Association on the "Bacteriology and Chemistry of Tetanus."

DR. CHARLES ADAMS, of First Regiment, Chicago, read a paper on

GUNSHOT WOUNDS OF THE CHEST.

He said from the time of Larrey to the present, the proportion of wounds of the chest to the total number of wounded had been very nearly 1-12½ per cent. The fatality under modern methods of treatment, had been reduced from 30 to 75 per cent. under the old methods. Contusions of the thorax vary in degree from the superficial to those accompanied by the disorganization of the contained viscera. It has been frequently observed that a soldier has received a blow upon the chest from a spent bullet, has even in some instances been knocked down by it, convinced from his sensations that the ball had entered the chest, and has returned to duty as soon as his fears were allayed with no after consequences or only those of a trivial nature.

Wounds of the bony walls of the chest, without penetration of its cavity, include shot injuries of the sternum, clavicle, ribs, scapulæ and vertebræ. Fractures of the sternum, without opening the pleura or pericardium are of rare occurrence; often bullets, especially of small caliber, are embedded in the bone substance, and splitting and extensive shattering of the bone have been observed.

The treatment of non-penetrating wounds of the chest should be governed by the same rules which are applied to the treatment of wounds in general, the ideal in chest wounds being primary aseptic or antiseptic occlusion. Most penetrating wounds of the chest are complicated by wounds of the contained viscera.

Emphysema, unless very extensive, may be confidently expected to disappear under the compression of the dressing. If of large extent, multiple punctures may be made. All penetrating wounds of the chest should be carefully watched for hemorrhage. A patient suffering from a penetrating wound of the chest should be treated by absolute rest. Cooling drinks should be administered, or small pieces of ice, to allay thirst. The application of cold to the chest surface is not often a practical measure as the cold will not be effective through such a dressing as should be primarily supplied. This should be liberally thick. Of the drugs which have been recommended in chest wounds nothing calms the patient, eases pain and has better effect upon the hemorrhage than morphia given by hypodermic injection. Ergotin administered in the same way may be of service in hemorrhage. Digitalis may be needed to strengthen a heart failing from acute anemia.

DR. J. D. GRIFFITH, Surgeon General of Missouri, contributed a paper on

GUNSHOT WOUNDS OF THE ABDOMEN,

which was read by Dr. LaGarde, in the absence of the author. The paper criticised observations that had been made as to the action of the new appliances of destruction on the living body and recorded some observations which the author had made.

The late rebellion in our own country, and the still more recent wars of Europe, had shown in their records the immense mortality of men wounded by the large leaden bullet. The ball now being used by our own Army and National Guard is heavier than either the English or Continental. The exceeding mortality of those wounded had naturally led our civilized world to look for a weapon more effective, yet more humane. This paradoxical condition had probably been found in our country by the adoption of the Krag-Jorgensen rifle, caliber 30. The small caliber repeating rifle is rapidly taking the place of the single loader of seven years ago. All the leading powers of Europe have taken steps towards re-armament with pieces not exceeding 31 in caliber. England, Germany, France, Austria, Italy,

Russia, Denmark and Belgium have adopted the small bore system. To produce such a rapid change of armament, the small bore rifle must possess decided advantages over the larger caliber gun. These advantages, as claimed by Professor Hibler, are lighter ammunition, flatter trajectory and greater danger space, less deviation by the wind, less recoil, greater penetration, greater accuracy, and last, and the one which particularly affects the surgeon, wounds while sufficient to disable, are more humane.

Dr. Griffith then dwelt upon the establishment of a government medical college as well equipped as West Point in its line, and supported in the same manner, for the purpose of thoroughly educating men for the battlefield, from the litter bearer and ambulance corps to the finished surgeon.

The author related a series of experiments with the new gun, 30 caliber, nickel coated ball with leaden core, driven by smokeless powder; weight of ball 220 grains, amount of powder 37 grains, the distance from the muzzle of the gun to the target being a little over 300 yards. A number of beef intestines, some full of water, some half full and others empty, were suspended in a wet bag of chamois skin. Two layers of this covering the intestines were separated by half an inch, and the bag and contents fired into. Several large dogs were also provided. The conclusion reached is that the new rifle is anything but a humane gun in the first zone, the explosive effects being perfectly terrific; death being instantaneous in the dogs, even though no vital parts were struck. Again, it was noted that wherever a vessel was struck, the opening was absolutely clean cut as if by a knife—no "curling up" of the inner coat, so that hemorrhage could only be checked by stoppage of the heart beat.

(*To be continued.*)

Medical Society of the Missouri Valley.—The annual meeting of this society will be held in this city September 21st (Thursday) and continue in session one day. Members contributing papers must send titles to the secretary prior to August 25th, so they can appear on printed program, mailed September 1st. Applications for membership can be sent to Dr. J. F. White, Council Bluffs, Iowa, with a fee of two dollars enclosed.

A full meeting is expected; a profitable session desired.

Secretary's office, Council Bluffs, Iowa, Aug. 10th, 1893.

F. S. Thomas, M.D., Secretary.

Southern Minnesota Medical Society.—The second annual session of the Southern Minnesota Medical Association met Aug. 3rd at the Rochester State hospital. Several interesting papers were read. The officers elected were: president, Dr. A. F. Kilbourne, Rochester; first vice president, Dr. S. H. Van Cleve, Mantorville; second vice president, Dr. R. C. Dugan, Eyota; secretary and treasurer, Dr. H. H. Witherstine, Rochester.

Prize Essay.—The Belgian Gynecological and Obstetrical Society have decided to found an international annual competition bearing alternately on a gynecological or obstetrical question. Entries for the first competition will close September 1st, 1894. Manuscripts, written in French, must be sent before that date to the secretary-general of the society, M. Jacobs, 12 Rue des Petits-Carmes; must be marked by a motto or design, and be accompanied by a sealed envelope bearing a similar mark and enclosing the competitor's name and address. The prize will be the sum of three hundred francs. The subject of the competition for the coming year will be: "Chercher à établir par des expériences personnelles, anatomiques, physiologiques, chimiques, etc., le rôle rempli dans l'organisme par l'écoulement menstruel."—*Am. Jour. Obst.*, Aug., 1893.

ASSOCIATION NEWS.

Membership in the American Medical Association.—The need for organization of local societies is apparent, and it is none too soon for efforts to be made in this direction. In accepting membership in the local or State society, as its qualification, the Association has for years taken the ground recently adopted by the Medical Society of the State of California. The onus of determining the professional fitness of an applicant is thrown upon the locality where he is best known, and upon presentation of the proper certificate there is no further question as to his eligibility. California is now ahead of most of the States in the possession of a more perfect organization. The present loophole in the constitution of the National organization is the dual portal of admission, and this the proposed constitution endeavors to remedy by providing that members can only join from a State society. The local society is the great factor of importance to the profession, and in States where membership in a local society is not a prerequisite of membership in the State society, the American Medical Association has at present no authority to uphold the "unit of professional organization."—*Occidental Med. Times*, Aug.,'93.

DOMESTIC CORRESPONDENCE.

The Treatment of the Morphine Disease.

To the Editor:—Sir—To any who may desire it I shall take pleasure in sending a paper giving in full detail a method of treating morphinism that is simple, satisfactory and successful; and far in advance of any mode yet presented to accomplish two cardinal objects—minimum duration of treatment and maximum freedom from pain.

J. Mattison,
Medical Director Brooklyn Home for Habitués.

A Query.

To the Editor:—Who is the *rising* chemist of New York city? Ans: He whose classic portrait precedes baking powder advertisements.

MISCELLANY.

New Cancer Cure.—A recent issue of that sterling medical journal the New York *World*, informs us that Doctors W. T. Bull and W. B. Coley of New York city have discovered a new cancer cure, in the *Streptococcus Erysipelatosus*.

Surgeon General of Washington.—Dr. J. B. Eagleson of Seattle, has been appointed surgeon general of Washington on the staff of the commander-in-chief, with the rank of colonel, in the place of the lat Col. E. L. Smith.

Saratoga Springs in Danger.—It is stated that a recent well-boring in the vicinity of Saratoga opened up a vein of dry carbonic acid gas, and those who are interested in the perpetuity of the Springs are in trepidation lest this vein may be the carbonizing agency of their various sparkling fountains. If that vein should be tapped so as permanently to affect the Springs the losses at that health resort would be very considerable; in the millions, possibly.

New Hospital.—The trustees of St. Barnabas hospital, Minneapolis, contemplate the erection of a new brick hospital building upon the site of their present frame building. The new building will cost about $25,000.

Distinguished German Dentists.—Dr. Emil Richter of Berlin, arrived in Chicago August 9th with a distinguished party of German dentists. They have made the journey here from New York by easy stages, stopping at the notable places on the way. At the Dental Congress to be held here Aug. 14th to 19th they will represent the fatherland, and in the meanwhile they will enjoy the world's fair. There are nearly a dozen members in the party,

THE PUBLIC SERVICES.

U. S. Naval Laboratory and Department of Instruction.

By order of the Secretary of the Navy dated June 22, the Naval Laboratory at Brooklyn will hereafter be known as the U. S. Naval Laboratory and Department of Instruction. Immediately after admission to the Navy, assistant surgeons will be ordered to that institution, for such study and instruction as may be necessary to familiarize them with the duties of medical officers ashore and afloat.

The course of instruction will occupy three months.

A professional record is kept of the assistant surgeons' work, and when examined for promotion this record will be transmitted to the Naval Medical Examining Board for inspection, to be returned to the Bureau on completion of the examination.

The Use of Disinfectants.

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
Washington, August 9, 1893.

Requisitions received from time to time indicate that certain medical officers of the Army are not well informed with reference to *the use of disinfectants*.

It may be the meaning of A. R. 1656 and of paragraph 36 of the Supply Table has been misunderstood.

A. R. 1656. "Carbolic acid, chloride of lime, sulphate of iron, corrosive chloride of mercury, solution of chlorinated soda, and other articles required as antiseptics or disinfectants in hospitals, and for general use at military posts, will be issued by the Medical Department upon the requisition of the medical officer."

Standard Supply Table, paragraph 36. "Disinfectants for general post sanitation will be issued by the Medical Department upon the annual requisition."

The mistaken idea that disinfectants are required "for general post sanitation" in the absence of any infectious material to be destroyed seems to be very common among officers and non-commissioned officers of the Army, and should not receive support from officers of the Medical Department.

The definition of a disinfectant adopted by the Committee on Disinfectants of the American Public Health Association in 1885 has now been generally accepted by well informed sanitarians. This is as follows:

"The object of disinfection is to prevent the extension of infectious diseases by destroying the specific infectious material which gives rise to them. This is accomplished by the use of disinfectants.

"There can be no partial disinfection of such material; either its infecting power is destroyed, or it is not. In the latter case there is a failure to disinfect. *Nor can there be any disinfection in the absence of infectious material.*

"Antiseptic agents also exercise a restraining influence upon the development of disease germs, and their use during epidemics is to be recommended when masses of organic material in the vicinity of human habitations cannot be completely destroyed, or removed, or disinfected."

At the conclusion of the Lomb prize essay, published by the American Public Health Association in 1885, the following propositions are formulated:

"*Disinfection* consists in extinguishing the spark, killing the germ, which may light up an epidemic in the presence of a supply of combustible material—filth.

"The object of *general sanitary police* is to remove this combustible material out of the way, so that no harm may result even if the spark be introduced.

"*Antiseptics and deodorants* are useful when it is impracticable to remove offensive organic material from the vicinity of human habitations, but they are a poor substitute for cleanliness."

Chloride of lime, carbolic acid, and mercuric chloride are issued by the Medical Department for use as disinfectants, properly so called. A solution containing 4 per cent. of good chloride of lime, or 5 per cent of carbolic acid, is suitable for disinfecting the excreta of patients with cholera or typhoid fever, or the sputa of patients suffering from diphtheria, scarlet fever, or tuberculosis. The floors, furniture, etc., in rooms occupied by patients suffering from an infectious disease may be washed with a 2 per cent. solution of carbolic acid, or with a solution of mercuric chloride of 1:1000. Soiled bed linen, underclothing, etc., used by such patients should be immersed in one of the above mentioned solutions before it is sent to the laundry. *But in the absence of any infectious disease, these disinfecting agents are not required, and their expenditure for purposes of general post sanitation is not authorized.*

Sulphate of iron and other cheap antiseptics and deodorants may be used when necessary. But the necessity for their use is a reproach upon the sanitary police of a post and should only be required under exceptional circumstances.

The alvine discharges of healthy persons do not require disinfection, and when properly disposed of do not require treatment with any chemical agent whatever. If water-closets or earth-closets are offensive this is due to faulty construction, to insufficient supply of water or dry earth, or to neglect of ordinary cleanliness. The attempt to remedy such defects by the systematic use of antiseptics is expensive and unsatisfactory in its results.

The same is true of foul drains, bad-smelling urinals, accumulations of garbage, etc. The proper remedy for such conditions is cleanliness and strict sanitary police.

When accumulations of organic material undergoing decomposition can not be removed or buried, they may be treated with an antiseptic solution or with freshly burned quicklime. Quicklime is also a valuable disinfectant and may be substituted for the more expensive chloride of lime for disinfection of typhoid and cholera excreta, etc. For this purpose freshly prepared "milk of lime" should be used, containing about one part by weight of hydrate of lime to eight of water.

During the prevalence of an epidemic, or when there is reason to believe that infectious material has been introduced from any source, latrines and cesspools may be treated with milk of lime in the proportion of 5 parts to 100 parts of the contents of the vault, and the daily addition of 10 parts for 100 parts of daily increment of feces.

While the feces of healthy individuals in privy vaults or on the surface of the soil are innocuous, it is well known that epidemics of cholera, typhoid fever, and camp diarrhœa are usually due to the contamination of drinking water or food by microörganisms contained in the excreta of persons suffering from these diseases. This may occur as the result of direct contamination of the water supply, and probably, also, by the transfer of infectious material to the surface of meats, milk, and other articles of food by flies which have recently been in contact with infectious excreta. This source of infection has not heretofore received proper consideration, and the probability of its occurring when the feces of patients suffering from the diseases mentioned are deposited upon the surface of the ground, or in open privy vaults, calls for extreme care, especially during times of actual or threatened epidemic. In camp, where it is necessary to use open pits as latrines, dry earth, quicklime, or wood ashes should be frequently thrown upon the surface of fecal accumulations.

All known disease germs are destroyed by the temperature of boiling water, maintained for a few minutes. This being the case the destruction of articles of clothing which can be subjected to the action of boiling water or of live steam without material injury is unjustifiable. *Exposure to steam under considerable pressure, or to superheated steam, which requires a specially constructed steam chamber, is an unnecessary exaction, free exposure to flowing steam for one hour being sufficient to secure disinfection.* But this applies only to articles which can be freely exposed in a steam chamber, and not to mattresses, pillows, bundles of clothing, etc. As a rule immersion in boiling water for half an hour will be the most convenient and most economical method for disinfecting articles of clothing, bed linen, blankets, etc.

When hair mattresses and pillows need disinfection it will be necessary to open them up, either before or after immersing them in boiling water or in a disinfecting solution, in order that the hair may subsequently be thoroughly dried. When this is done the fact will be reported to the medical director of the department, and instructions will be given as to the disposition of the material.

When of little value, or in the absence of proper facilities for disinfection, mattresses, pillows and clothing may be destroyed in compliance with A. R. 1625; but the destruction of articles which can be disinfected without material injury by immersion in boiling water or a disinfecting solution is not authorized.

GEO. M. STERNBERG,
Surgeon General U. S. Army.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from August 5, 1893, to August 11, 1893.

First Lieut. FRANK R. KEEFER, Asst. Surgeon, is granted leave of absence for one month and fifteen days, to take effect when his services can be spared.

Capt. MARLBOROUGH C. WYETH, Asst. Surgeon, extension of leave of absence granted on account of sickness, is still further extended two months on account of sickness. By direction of the acting Secretary of War.

Capt. MARCUS E. TAYLOR, Asst. Surgeon, having been found incapacitated for active service by an Army Retiring Board, will proceed to his home and report thence by letter to the Adjutant General of the Army.

Capt. HENRY S. T. HARRIS, Asst. Surgeon (Ft. Keogh, Mont.), is granted leave of absence for one month, to take effect about August 16, 1893.

Major J. V. LAUDERDALE, Surgeon U. S. A., is hereby granted leave of absence for one month, to commence about September 5, 1893.

Major GEORGE W. ADAIR, Surgeon U. S. A., is granted leave of absence for three months, to take effect on or about September 4, 1893.

First Lieut. CHARLES E. B. FLAGG, Asst. Surgeon, will proceed to the Yosemite National Park, California, for duty with Troop I, Fourth Cavalry, relieving Capt. LEONARD WOOD, Asst. Surgeon. Upon being thus relieved, Capt. WOOD will return to his station, the Presidio of San Francisco, Cal.

Capt. EUGENE L. SWIFT, Asst. Surgeon, is granted leave of absence for one month, to take effect upon the return from detached service of First Lieut. HENRY C. FISHER, Asst. Surgeon.

First Lieut. ALFRED E. BRADLEY, Asst. Surgeon U. S. A., is granted leave of absence for one month.

LETTERS RECEIVED.

(A) Ayer, N. W., & Son, Philadelphia, Pa.; Anderson, W. S., Detroit, Mich.; (B) Beltman, B., Chicago; Bates, X. T., Poughkeepsie, N. Y.; (C) Collis, Warren J., Boston; Chambers & Co., J. H., St. Louis, Mo.; Cutter, Ephraim, New York; Crothers, T. D., Hartford, Conn.; (D) Doering, E. J., Chicago; Dietz, Chas. J., Chicago, Ill.; (E) Eagleson, Jas. B., Seattle, Wash.; Eichberg, Joseph, Cincinnati; (G) Ground, Wm. E., West Superior, Wis.; Gihon, A. L., U. S. N.; (H) Hunt, T. K., Cadott, Wis.; Hughes, C. H., St. Louis; (M) Miller, Roland E., Napa, Cal.; Malsbary, G. E., Cincinnati, O.; Merrell, Wm. S., Chemical Co., Cincinnati, O.; Mellier Drug Co., St. Louis; Manley, Thos. H., New York; McLauthlin, H. W., Denver, Col.; Mayo, W. J., Rochester, Minn.; (P) Parvins Sons, S. H., Cincinnati, Ohio; (R) Ricketts, B. M., Cincinnati; Reed, C. A. L., Cincinnati; Rumbold, Thos. F., San Francisco; Ridge, S. M., Kansas City, Mo.; (S) Slay Bros., New York, N. Y.; Sternberg, Gen. Geo. M., Washington; Smith, J. F., Baltimore, Md.; (V) Vaughan, Geo. T., Chicago; (W) Wiltrout, J. D., Hudson, Wis.